The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XXVI. May 7, 1932 No. 671

The Index to Contents, which formerly appeared in this position, will in future be found on the preceding right hand page.

Notes and Comments

Patent Law Reform

A MEMORANDUM setting out the proposed amendments to the Patents and Designs Bill has been issued in the form of a White Paper by the Board of Trade. These amendments include one which seeks to constitute an appeal tribunal consisting of a High Court Judge who will be nominated by the Lord Chancellor for the purpose of hearing appeals against decisions of the Comptroller of Patents, deleting that portion of the Act which states that where the Comptroller refuses to accept an application or requires an amendment the applicant may appeal to the Law Officer, that is, the Attorney-General or Solicitor-General. That section of the Act which deals with the revocation of a patent is also amended to stipulate the grounds on which a patent may be revoked, in addition to the original clause by which every ground is available by way of defence. Among the stipulated grounds in the amended clause are that the invention was the subject of a prior claim, that the applicant for the patent was not the true and first inventor, and that the patent was obtained in fraud of rights of the person applying for the order, or of any person under or through whom he claims. It might also be stipulated that the invention is obvious and does not involve any inventive step, having regard to what was known or used prior to the date of the patent, and that the invention is not useful.

Education for Commerce

THE fifth triennial congress of the International Society for Commercial Education, which is to be held in London in the last week of July, will be the first of its kind to be held in this country. The congress will receive the active support of the Prince of Wales, who has promised to address the closing session of the congress at the Grocers' Hall on July 29. A good deal of attention has been paid by the chemical industry, in common with other principal industries, to the question of education for salesmanship in the past two or three years, and the forthcoming congress will be the culmination of a series of events that should impress upon the country the importance of considered recruitment and adequate and suitable education and training for the conduct of commerce. One of the events preceding the congress will be the twenty-first anniversary conference of the Incorporated Sales Managers' Association. This conference will sit in London from May 20 to May 23, and the Prince of Wales will speak at the opening session. On April 27 Mr. H. Ramsbotham, M.P., Parliamentary Secretary to the Board of Education, addressed the Royal Society of Arts on "Education for Commerce," and on June 21 Sir Francis Goodenough, the chairman of the administrative committee of the International Congress, will give his presidential address to the Association for Education in Industry and Commerce. As a preparation for the International Congress there will be an economic course, open to students from all countries, at the London School of Economics from July 14 to July 21. The International Congress will be attended by delegates from many Continental countries, the United States, Egypt, Canada, Persia, India, and a large number of delegates from commercial and educational organisations in Britain. The congress has the support of the Lord Chancellor, the present and past Presidents of the Board of Education, the President of the Board of Trade, and the heads of the great universities, of the leading municipalities and of the Dominions and Colonies. The delegates will be welcomed on July 25 by the Lord Mayor of London, and the opening general session will be addressed by the President of the Board of Education, the President of the International Society for Commercial Education (M. Charles E. Boissevain, of Holland), and the president of the congress (Sir David Milne-Watson).

The Congress Programme

THE programme will include sessions dealing with the following subjects:—Methods of giving students an interest in foreign countries and an understanding of their peoples; methods of imparting a knowledge of merchandise to students; training in methods of salesmanship; the training of responsible business administrators; the teaching of foreign languages—scope, method, and importance; women in business; recruitment for commerce, preliminary training of (a) higher personnel, (b) clerical and other routine workers; vocational guidance and selection; psychological test, etc.; training for office work; retail trade—methods of training boys and girls for employment in retail distribution; mechanical aids for teaching commercial subjects—the cinema, the gramophone, the radio, etc.; commercial teachers—the supply of training of commercial teachers, methods of keeping teachers in contact with commercial practice; the development of commercial education since the war. The session dealing with "Women in Business"—a subject specially recommended by the American branch of the International Society—will be presided

over by the Duchess of Atholl, M.P. Mr. H. Ramsbotham, M.P., will preside over and address the session dealing with "The Training of Responsible Business Administrators." The congress will be entertained by the Government Hospitality Committee at a reception at Stafford House on July 25 and by the Lord Mayor, Aldermen, and Corporation of London at a conversazione at the Guildhall on July 26.

The British Association

THE student of chemical science and engineering cannot but be interested in the announcement of the annual meeting of the British Association to be held at York from August 31 to September 7, the preliminary programme of which was briefly referred to in these pages last week. There is something distinctly appropriate in the fact that the Association, following last year's centenary celebrations in London, should have chosen the city which formed its birthplace in 1831 as the venue for this year's meeting, and the advance programme serves to show that the character of the meeting will be in keeping with the high traditions of the Association. Apart from Sir Alfred Ewing's presidential address on "An Engineer's Outlook," there are many topics of intimate interest to the chemical and allied industries. Dr. W. H. Mills, in his presidential address to the chemistry section, will deal with the important subject of stereo-chemistry, which will also form a topic for discussion, while Professor Miles Walker's address to the Engineering Section on "The Call to the Engineer to Manage the World" will be of equal importance.

York and its environs will provide the members of the Association with a good deal of topical interest. The chemists will discuss water pollution, with special reference to the present investigations in the River Tees, which have been the subject of extended comment in recent reports of the Water Pollution Research Board. The relation of the millstone grit to the carboniferous limestone, the gravels of the Wolds margin, and the concealed coalfield of East Yorkshire appear in the geological programme. The university movement and adult education in Yorkshire will be discussed in the educational section, and the engineering section will consider railway traction by steam, oil engine, and electric power. Evening discourses will be given by Sir Arthur Hill on plant products of the British Empire in relation to human needs, and by Mr. C. C. Paterson on uses of the photoelectric cell; while Mr. H. E. Wimperis will give an afternoon lecture on high speed flying. An evening reception will be given by the Lord Mayor of York (Alderman Vernon Wragge) and the Sheriff (Mr. Arnold Rowntree). Many points of interest in the neighbourhood of York will be visited. The Yorkshire Philosophical Society, mother society of the Association, will welcome its well-grown daughter by throwing open its museum and gardens to members daily throughout the meeting.

A New Source of Rayon

USING low-priced nitric acid, chemists of the United States Department of Agriculture have developed a process for making high-grade cellulose from bagasse, the waste from sugar cane after the sugar has been extracted. These experiments, carried out by D. F. J. Lynch and M. J. Goss, of the Colour and Farm Waste Division of the Bureau of Chemistry and Soils, produced a higher percentage of high-grade cellulose from bagasse than any previous attempts. From 250,000 to 500,000 tons of bagasse accumulate each year at the sugar-cane mills of the United States. Large quantities are used as fuel by the sugar mills, and for several years much has been used for manufacturing insulating building material, but the possibility that a higher grade of cellulose could be produced from bagasse led the chemists to experiment with it. The process increases the potential value of bagasse, and at the same time offers a new and steady source of raw material for the rayon industry. The department regards the process as now developed to a point where commercial interests can work out the practical problems of manufacture. The method of treatment known as the nitric acid pulping process, consists of soaking the raw material in a weak nitric acid solution for several hours at a medium temperature, then heating it for an hour, and finally washing and boiling in dilute sodium by hydroxide to produce a soft, bleachable pulp. Cheaper supplies of nitric acid make the process commercially feasible. Some of its advantages as compared with older methods are that open tanks are used instead of pressure tanks, and that it takes less heat, power and time.

Progress at the Mellon Institute

TWENTY-FIVE years have passed since the foundation of the first industrial fellowship at the University of Kansas. In 1911 this industrial fellowship system was established at the University of Pittsburgh and since then the Mellon Institute has had fellowships on 230 distinct subjects, on which 775 scientists and engineers have been employed. In all, during the period 1911-32, 313 fellows and 357 fellowship assistants of the Institute have completed their services to science and technology in the institution and have entered the fields of industry and education. As trained additions to the forces of manufacturing and teaching, these men, many of whom are now specialists of high professional standing, constitute the Institute's greatest contribution to humanity.

Throughout the fiscal year, March 1, 1931, to February 29, 1932, 75 industrial fellowships were in operation. These different investigations required the services of 132 fellows and 44 assistants during all or part of the year.

Early in the fall of 1931 Toledo Synthetic Products, Inc., Toledo, Ohio, began the commercial production of Plaskon, a novel heat-reactive molding compound developed by A. M. Howald on the Nitrogenous Resins Fellowship. This company was organised and its plant was erected expressly for the purpose of manufacturing this unique synthetic resin. The multiple fellowship on Coke, supported by The Koppers Research Corporation, has continued its intensive large-scale investigations of coke manufacture and the properties of coking coals. A number of improvements in coke preparation have been developed and put into practice. Considerable work has also been done on improving processes for recovering ammonia and on refining crude benzene products.

The Spectroscope in the Analytical Laboratory

Its Applications and Limitations

This article is based on information supplied by Adam Hilger, Ltd., of London, who have done much to advance the application of spectroscopy to analytical problems, by attention to the intricate details of instrument manufacture and by research carried out in their spectrographic laboratory.

GREAT advances have been made during the last few years in applying spectroscopy to metallurgical analysis and two reasons are, in part, responsible for this. First, there is the importance in metallurgical work of speed in the production of laboratory reports in order that continuity of production may not be broken and, secondly, the great ease with which arc spectra may be produced from metals no matter what the shape or size of the specimens may be. Similar advantages to those gained in metallurgical work are also to be gained in chemical analysis. The method is rapid, and the

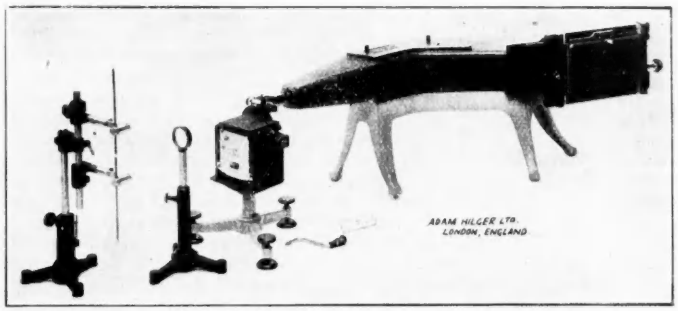


Fig. 1. An Outfit for Quantitative Spectrum Analysis

accuracy as regards amounts up to 0.5 per cent. is equal to that usually obtained by ordinary chemical methods, even where the separations are easy. Further, the accuracy, unlike that of an ordinary analytical determination, when stated as a percentage of the percentage present, remains constant even when the content is extremely small, and can be of the order of 10 per cent. Thus, for percentages less than 0.5 spectrographic methods could usually be substituted with advantage for the chemical ones. Where difficult or complicated separations are involved, the spectrographic methods often reveal unexpected errors in the chemical analyses, or discrepancies between the findings of independent analysts, and in such instances the spectrographic method would appear to be the more reliable even where the chemical methods are ostensibly more precise. The photographed spectrum is also far superior to chemical analysis in speed, certainty and completeness, for making a *qualitative* analysis of the metallic constituents of a complex substance, in addition to which the spectrogram is a *permanent* record of the analysis.

Quite apart from the use of spectrum analysis as what may be called a complete analytical agent or method it must be pointed out that nothing rivals the spectrometer for detecting, without the necessity of separation, minute quantities of metals present in any element, compound or mixture. Hence, a great deal of time could be saved and considerably more certainty achieved if a visual spectrometer were available for consultation during the course of a chemical analysis, whilst the qualitative analysis of the metallic constituents of a substance which the spectrometer gives so easily is an invaluable basis for planning chemical analysis. Filtrates may be examined in a moment to check that the precipitate is not coming through in solution; precipitates may be examined, after weighing, for freedom from constituents which should have been separated, whilst, after a certain amount of experience has been gained, approximate estimations may be made at sight. Furthermore, the necessity of separating the metallic constituents into the usual chemical groups, and the need for special tests where certain metals occur together are avoided by the use of the spectrometer. For such work the visual wave length spectrometer is ideal and it is no exaggeration to say that no instrument with the exception of the balance should be so necessary to the analytical chemist.

Complete Analysis by Spectrographic Methods

Where the complete analysis is being performed by spectroscopic methods a spectrograph is required in place of a visual spectrometer, so that an actual photograph of the spectrum may be obtained and also because many of the sensitive spectral lines which interest the analyst lie in the ulltra-violet part of the spectrum which is invisible to the eye. In practical use the spectrograph also has a distinct advantage in allowing a spectrograph of a sample to be quickly taken by any intelligent laboratory assistant so that the chemist can examine the photograph in detail at his leisure.

In the case of elements whose spectra are complex, the number of lines may at first seem confusing, but after the distinctive groups have been identified, a comparison spectrum will at once indicate, by eliminating the lines common to both spectra, the lines due to the impurities. The time taken in the actual detection of an impurity is only a matter of a minute or so, and with practice the observer will recognise at a glance the distinctive groups of the sensitive lines of various elements. To take but a single example, titanium appears to be invariably associated with silica, and hence after several siliceous substances have been examined spectroscopically, the observer will become familiar with the characteristic group of titanium lines which he will thereafter recognise at a glance in other associations. The spectrograph, however, does not discriminate between that which is looked for and that which is wholly out of mend. For instance, few would suspect the presence of chromium in a sample of water, yet chromium is an occasional, although rare, constituent of natural waters. Its proportion is always minute and it would never be found by chemical means unless specially and laboriously sought in a large quantity of material, but using only a

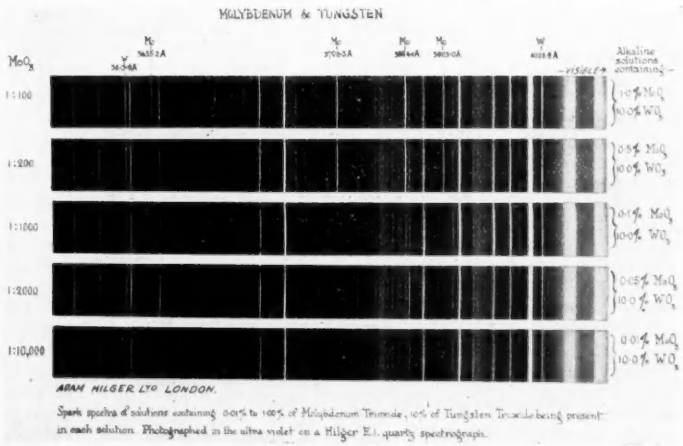


Fig. 2. A Group of Typical Spectrograms

few milligrams of the total solids left on evaporation and examining the residue by means of the spectrograph its presence is revealed without special effort and without anticipation.

Quantitative Spectrum Analysis

The outfit illustrated in Fig. 1 consists of a quartz spectrograph, a logarithmic sector, and the usual condensing lens, arc and spark stand. The rotating logarithmic sector is used for the purpose of making an analysis quantitative, quantitative spectrum analysis being based on correlating the in-

tensity of spectral lines with percentage composition. When set rotating in front of the spectrograph slit it produces lines on the photographic plate which fade to extinction at one end, the length of the lines being a function of their intensities. Once the manner in which the intensity of a line varies with the content of the element producing it, then the analysis of unknown samples may be taken in hand.

Quantitative spectrographic measurements are now a matter of routine in a number of industrial laboratories, and indeed form the sole check which is applied in the control of many operations. They have proved themselves from the first to be peculiarly suited to a type of determination which is both tedious and uncertain when approached by direct chemical operations—the determination of impurities and of constituents present in small quantity. While this has so far been the especial province of the spectrograph, it must not be assumed that determinations of major constituents are necessarily outside its powers, for these are being rapidly extended by further investigation.

Metallurgical Investigations

In metallurgical inquiries traces of unsuspected elements which modify the properties of an alloy are detected, often where chemical investigation has failed and where it is very unlikely to succeed, except on adopting a long and tedious separation from a large quantity. This is exemplified in a recent paper by Dr. S. Judd Lewis entitled "Spectroscopy as an Aid in Metallurgical Analyses" ("Metallurgist," February 27, 1931). Some very pure graphite under analysis yielded a brown ash containing ferric oxide and silica, either or both of which it would be conventional to determine separately and leave the remainder in obscurity. Spectrographic inquiry resulted in discovering vanadium as the dominant element and, following this lead, the composition was found to be Fe_2O_3 0.0031, SiO_2 0.0113, V_2O_5 0.013, TiO_2 0.01, B_2O_3 0.003 per cent., with traces of ten other elements. The same article reveals the complex composition of an iron of high repute for its purity, twenty-two elements being found spectrographically instead of six in the conventional analysis in a works laboratory, although the proportions of some of the unsuspected elements were greater than some of those sought in the ordinary course.

Ten milligrams of sample is usually ample as a sample for investigation by spectrographic means, but complete analysis, including all metals occurring to the extent of 1 per cent, or more, can usually be made with a fraction of a milligram, while the ten-thousandth of a milligram of lead and certain other elements will suffice for full indications, however complex the material which carries it.

Problems in Chemical Analysis

The wide range of problems in general chemical analysis which can be successfully attacked by spectroscopic methods includes the rapid qualitative analysis of the whole of the metallic constituents of a substance as a basis for planning the chemical analysis; the detection and estimation of traces of metallic impurities in inorganic precipitates, residues and powders, organic substances (*e.g.*, foodstuffs), citreous substances (*e.g.*, glasses and some slags), refractories, clays, etc.; the testing of the purity of analytical reagents; the detection and estimation of rare metals in minerals; and the investigation of substances of which only a very small quantity is available. The chemical detection of small quantities of nickel, vanadium or molybdenum in a steel; of zinc or lead in relatively pure copper; or traces of strontium barium and magnesium in a calcium salt used as analytical reagent, for instance, are equally long and tedious processes which require close attention to detail of chemical and physical conditions affecting the progress of separation, any deviation from which may lead to error. Treated spectroscopically, however, the whole substance is disintegrated into its elements under the influence of the arc or spark and each element is excited so as to emit rays of characteristic wave length.

Within the past few weeks Dr. Judd Lewis has described a method of using spectroscopically pure salts for quantitative spectroscopic analysis ("Chemistry and Industry," March 25, 1932, page 271). The method is known as the "ratio quantitative system" and the spectrum of the substance under analysis is compared with that due to a ratio powder which has one dominant element as base and then a number of other elements present in definite ratios with the main substance. A number of such ratio powders are available, there being powders suitable, *e.g.*, for agricultural, biological and metallurgical analyses. It is believed that the complete quantitative analysis of a small quantity of any material, such as, for example, a biological ash may by the means outlined be performed with an accuracy and reliability much higher than that obtainable by any other means, and the quantitative determination of minor quantities—such as may barely be detected chemically—be made a routine matter.

Suitable Reference Books

Prior to the war the lack of accessories in the shape of wave length tables, photographs of spectra, etc., acted as a deterrent against chemists taking up these new methods, but this has now been remedied by the publication of several useful books. The question of equipment suitable for metallurgical analyses is very carefully discussed in "Spectrographic Outfits for Metallurgical Analyses" (published by Adam Hilger, Ltd., 24 Rochester Place, Camden Road, N.W.1) which is kept up to date and frequently supplemented by issues of a further publication, "The Bulletin of Spectrum Analysis," which contain summaries of all important papers on spectrum analysis. The outfits recommended for metallurgical work are, speaking generally, also suitable for other kinds of spectrographic analysis. For visual work the "Visual Lines for Spectrum Analysis," by D. M. Smith, gives the visible lines of most of the metallic elements which still appear when the quantity present is small; this book is very useful for those working with any form of wavelength spectrometer. For spectrographic work the "Wave Length Tables for Spectrum Analysis" by F. Twyman and D. M. Smith supplies all the tables necessary in the daily practice of spectrum analysis by spectrography. This book includes the sensitive lines in spark spectra, whether produced between electrodes of metal solutions or fused salts; tables are also given for use in analysis by arc and flame.

Where one is interested only in the detection of substances, the above tables suffice, but where it is desired to get quantitative indications, it is not sufficient to have the lines which appear with very small quantities. Other and fainter lines can be found in Kayser"s "Tabelle der Hauptlinien der Linienspektra aller Elemente." Having mastered the contents of "The Practice of Spectrum Analysis" (compiled by F. Twyman) and having become fairly adept in using the methods described, the user of the spectrograph should then make himself familiar with "Foundations and Methods of Chemical Analysis by the Emission Spectrum," the authorised translation of Gerlach and Schweitzer's "Die Chemische Emissionspektralanalyse."

London's New Coke Oven Plant

Inaugurated by the Prince of Wales

THE new coke oven plant which has been erected at the Beckton works of the Gas Light and Coke Company at a cost of £1,000,000 was formally inaugurated by the Prince of Wales on May 3. After operating the plant, he spent more than two hours in a close inspection of the works and the research laboratories. The new plant consists of 60 Koppers twin-flue combination ovens, and is capable of carbonising 1,200 tons of coal a day. Each oven is 40 ft. long, 14 ft. high, and nearly 18 in. wide. The lay-out of the installation permits extension to an ultimate capacity of 4,800 tons of coal a day. The construction of the ovens embodies the latest features of oven design, such as self-sealing doors and brick-lined off-takes. The temperature of the chambers is kept at 1,400° C.

The PRINCE, who was welcomed by Sir David Milne-Watson, governor of the company, was presented with a silver dolphin designed and executed by Mr. Omar Ramsden and mounted as a paperweight as a souvenir of his visit. He afterwards operated a switch which led to the discharge of the hot coke from one of the ovens. Later, he inspected the producer gas plant and the existing gasworks installations, taking particular interest in the by-products department.

The Drying of Atomised Fluids

Principles and Processes

METHODS of drying atomised fluids by means of hot air have been known for some considerable time, the fluid or semi-fluid being atomised by sprays, or high speed revolving discs in a chamber, so arranged that it falls in counter current to a stream of hot air. Due to the small size of the particles produced, evaporation takes place in a fraction of a second. This rapid evaporation with consequent absorption of heat produces a zone of low temperature in the drying chamber considerably lower than the incoming hot air. The powder obtained is in very fine state of division, whilst evaporated moisture is carried off with the waste air. The process can be adapted to treat the most diverse materials, but finds its chief application to organic substances, such as milk, malt extract, eggs, gelatine, and fruit juices, as well as soap, preservatives, etc.

In 1872 a patent was granted to R. Percy, of New York, for a method of atomised drying of solids, semi-fluids and fluids by hot or cold air, the atomised material being dried whilst the particles are floating in the drying air. A later German patent described an apparatus for the evaporation, thickening or drying of fluids, solvents or emulsions, accomplished by feeding the material on to a series of rapidly revolving discs or horizontal plates, set in a chamber, where the air currents are baffled and the mixing of the atomised material with the currents of hot or cold air causes the drying.

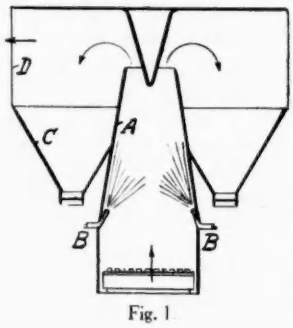


Fig. 1

In 1901 an American patent outlined the method of obtaining blood, milk, etc., as a dry powder, these fluids being atomised under pressure, by means of a spray and exposed to a stream of hot air (Fig. 1). Here the drying air enters the bottom of the chamber A and the fluid is atomised by sprays B. During the mixing of the hot air and the atomised fluid, drying takes place, and the air together with the dried particles pass into C, where the solid particles settle out, whilst the waste air leaves the apparatus at D.

In 1906 American patent was granted for apparatus to thicken and dry milk, but instead of hot air, pre-heated steam was used. The drying cylinder (Fig. 2) is steam jacketed, and the atomising is obtained with a plate C operated by a turbine B, the fluid entering at E and the vapour escaping at F. A later patent (Fig. 3) describes a cylindrical vessel A in which is arranged a high speed centrifugal B, the fluid to be dried being fed through a hollow shaft to the centrifugal, whilst the atomised fluid is dried by a stream of hot air which rises vertically through the heat coils at C in the bottom. The powder is carried with the vapour through outlet D, and passed into a bag house. In this apparatus (patented in 1908) is really first recognised the importance of an atomiser for producing the small particle size necessary for rapid drying.

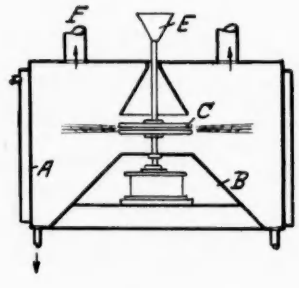


Fig. 2.

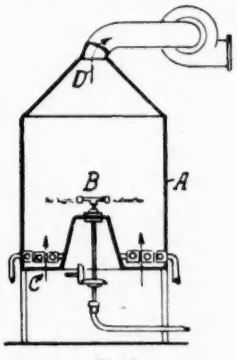
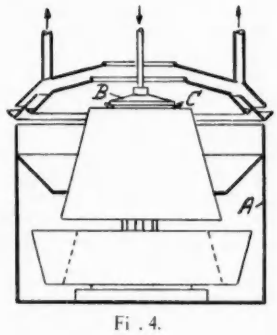


Fig. 3.

Atomising can be done by high speed rotating apparatus under gravitation or by sprays under high pressure. The drying air is directed in parallel as well as vertical or irregular lines to the direction of the atomised fluid. A German patent of 1911 (Fig. 4) refers to the drying of milk, B being a high-speed centrifugal, by means of which the liquid to be dried is spread out in a cylindrical vessel A in a horizontal uniform layer, where it is dried by a layer of steam which escapes either above or beneath the spreading disc C. Another method of atomising also patented in 1911 is carried out in a square vessel instead of a round vessel. The fluid to be dried is fed through atomisers in a horizontal layer, whilst drying air is blown in at an angle of 90°, possibly to avoid any whirling. The spent air and vapour escapes above the atomising area, through holes which have the same direction as the inlet.



Fi . 4.

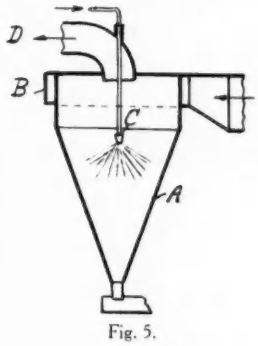


Fig. 5.

The Krause method, patented in 1920-21, follows the lines of the last mentioned patent. The material to be dried is spread in the form of a horizontal mist by a high-speed centrifugal. The drying medium, by the centrifugal force of the liquid, is forced to the edge of the vessel, and is stated only to penetrate upwards round the edges where the drying takes place. In spite of its claims that the air only penetrates at the edge, the stream of air does rise vertically throughout the main air of the vessel. In 1912 an American patent was granted in which air at 300° C. was mixed with the atomised material. To avoid ruination of the material at this high temperature a stream of cold air was blown in at another point in the dryer. It is possible to use high temperatures because the heat absorption of a large area quickly produces a cooling atmosphere, and as is well known high temperatures are more economical, but in its present form it is questionable whether it would deal with delicate materials, such as milk.

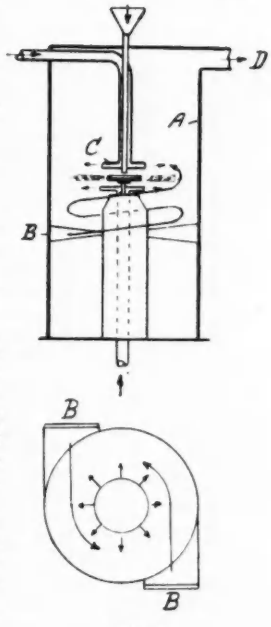


Fig. 6.

Fig. 5 shows the principle of the construction of apparatus patented between 1913 to 1927. Hot air enters by a channel B which is tangential, into a drying chamber A causing circular movement, escaping at D with the entrained moisture. The fluid is atomised under high pressure at spray C. Dried particles are collected in the lower part of the drying

apparatus, which has a conical bottom. Although the circular motion of the air is progressive, the air does not seem to have the opportunity of evaporating the moisture due to the arrangement of the outlet.

From 1917 to 1921 the German patents revert to broad surface atomising and deal with an obliquely constructed re-bounding wall into the drying room to avoid the disadvantage of obtaining not uniform material caused by different drying times. This re-bounding wall is a decided improvement, but does not answer the case entirely. Other patents recognise the disadvantages the above apparatus has of requiring enormous drying rooms, but constructing partition walls and forcing the drying air to alter the direction of flow, and therefore, to travel longer distances in smaller space. Disadvantages caused by the material being exposed for too long a period at high temperatures are recognised by an American patent which tried to avoid this disadvantage by drying in the upper part of a circular chamber with a high speed centrifugal. The chamber is divided theoretically into several parts by arrangements of inlets and outlets for the air. In the upper layers low temperature air enters the drying chamber and in the lower portion hot air is fed in.

Recognising the defects of these methods, Zahn and Co., of Berlin, introduced the "Ravo Rapid" system. Whilst with all the dryers described, the air currents impinge directly against the atomised material, which is not favourable for thorough mixing, in the "Ravo Rapid" system (Fig. 6) the necessary amount of drying air is fed horizontally at point B occupying the whole diameter of the drying chamber A. Air rises spirally against the horizontal stream of atomised material, and thorough mixing and drying takes place, using the heat to the best advantage. The atomising is done by the disc C, which is rotating at high speed. The material falls to bottom of chamber and from there is transported by a mechanical conveyor, but a portion of the dried material escapes with the waste air at point D, and is recovered by a bag filter.

In the "Ravo Rapid" atomiser the equality of particle size of the mist is essential for rapid and perfect drying. Atomisers operating on a centrifugal principle prove to be superior to sprays. The possibilities of the sprays choking due to foreign material, the limit in production, and the low saturation of the liquid with air often prevents the use of sprays. The centrifugal atomiser differs chiefly in the way in which the liquid is carried to produce the uniform and wide spreading layer. With open plates the liquid does not attain the speed necessary for atomising. The "Ravo Rapid" atomiser is a disc-like closed vessel which carries the fluid with it, and which has at its periphery a number of channels to cause the spray. The mist is supported by the air pressure which travels in the same direction as the atomised fluid. By this combination of atomiser and blower, it is possible to dry in large quantities utilising the largest portion of the heat which is available with considerable reduction in heat losses which are often considerable in atomising processes. Such a drying process is particularly applicable to very sensitive materials without affecting their properties.

Large Scale Industry and Transport

Next Sectional Meeting of the World Power Conference

THE Swedish National Committee of the World Power Conference, acting in agreement with the National Committees of Denmark, Finland and Norway, announces that a sectional meeting of the World Power Conference will be held in Scandinavia from June 26 to July 10, 1933. The conference will be devoted to a study of the power questions of large scale industry and transport. The technical sessions will be held at Stockholm. In connection with the conference, it is proposed to arrange lectures, inspections and tours in Denmark, Norway and Sweden, as well as an excursion to Finland.

All countries represented in the organisation of the World Power Conference have been invited to participate in the 1933 sectional meeting, to offer through their National Committees reports for publication and to appoint official delegates.

Attention will be primarily devoted to fundamental engineering and economic problems, rather than to questions of technical detail. Special points of particular interest for different branches of industry will, however, be discussed at some of the sessions. In connection with the sectional meeting of the World Power Conference, there will also be held the first plenary meeting of the International Commission of Large Dams.

Supply of Energy in Large Scale Industry

Among the many subjects in the field of power and heat supply for large scale industry, attention will be focussed upon the question of how large industrial plants can meet their energy requirements in the most economical way. A main point will be to investigate whether it is better for a large industry to have its own power stations or to purchase power from the general electric supply or, eventually, how to combine both systems. Here the question arises whether it is most expedient for industrial consumers to purchase power for their base load and to provide for peak power at local plants, or vice-versa. The co-operation of water power and thermal power in industrial plants will also be studied.

Interest attaches to the advantages to be obtained by interchange of energy between local industrial power plants as well as between industrial and public power systems. Synchronous operation, increasingly common, involves many technical-economical problems which should receive attention in this connection. Furthermore, the industrial energy system should be looked upon more broadly, as a combined heat and power supply. One group of rationalisation themes bear upon the possibility of adjusting supply and demand by storing heat. Another bears upon the utilisation of secondary and by-product fuel. A main theme running all through this section will be the economic importance of the load factor, applied both to the power supply and to the industrial plant as a whole.

The Steam Heat Consuming Industries

This section is primarily intended for special energy questions of the pulp and paper industries, such as cooking, drying and ventilation. Here belong also many special applications of principles in regard to power and heat combinations, etc., which may have been treated from a more general point of view in the previous section, such as the utilisation of low grade heat in the steam cycle, the use of wood refuse and black liquor as fuel, etc.

Special energy problems of the iron and steel industry will also be discussed. To this group belong combinations of metallurgical processes and power production by steam and gas motors, distance transmission of gas versus local gas production, methods for increasing the energy economy of furnaces for heating and melting. Certain special power problems also may be dealt with here, for instance, those arising from the load variations in steel rolling mills.

The electrical heating section of the programme embraces the utilisation of electrical heat for melting, heating and other heat treatment of ferrous and non-ferrous metals. It is not intended, however, to include subjects relating exclusively to electro-chemical industries or electric blast furnaces, as it is felt that this would unduly widen the scope.

Energy Problems of Transport

The questions which at present appear to be most vital in this section bear partly on the competition between railway electrification and the use of steam and Diesel locomotives for long-distance traffic, and partly on the competition between electric railway and bus transport for city and suburban needs. In marine transport the questions of motor versus steam propulsion, electric power transmission, etc., may be discussed, regard being had to the various requirements entailed both by fast traffic and by cheap traffic.

British Sugar Beet Society

The Past Year's Activities

THE annual meeting of the British Sugar Beet Society was held at the Hotel Victoria, London, on Thursday, April 28. The report of the executive committee for the year 1931-32 stated that no new beet sugar factories had been built during the year, notwithstanding that there were at least two suitable areas, notably in the South and West of England, where the necessary acreage of sugar beet from farmers might have been forthcoming.

Although in the season 1930 there was a 50 per cent. increase in the area sown under sugar beet compared with 1929, 348,000 acres having been grown, in the past year (1931) the acreage fell to the level of 1929, namely 230,000 acres. This is attributable to the reduced beet prices consequent upon the fall of the subsidy by 50 per cent., and the abnormally low level of world prices for sugar. The season was unfavourable in respect of yield, the average being 7.1 tons per acre, as compared with 8.8 tons in 1930. The sugar content was high, the average being 17.3 per cent., compared with 16.7 per cent. the previous year.

Preliminary reports of the present contracting campaign, still proceeding, indicate that the area of sugar beet to be sown this year will be 280,000 acres. All factories (with the exception of Kelham, owing to difficulties in securing an adequate acreage) are expected to operate this coming manufacturing season.

Beet Prices

The basis of beet prices in this country is a beet of 15½ per cent. sugar content, which should not be confused with the percentage of sugar extracted upon which the subsidy or preference is earned, and which depends upon the purity of the beet and the efficiency of the factory. Variations in sugar content have affected the beet price by 2s. 6d. for each 1 per cent. above or below 15½ per cent., except in the seasons 1928/30, when the figure was 3s., increased to 3s. 4d. in the higher degrees of the scale. In the season 1930, the last year of the second stage of the subsidy, beets averaging 17½ per cent. sugar content were paid for at the rate of 52s. 4d. per ton, compared with 59s. during the first stage of the subsidy at its highest rate.

Last year (1931) the 12 factories which were parties to the British Sugar Industry (Assistance) Act, 1931, referred to in the last annual report, paid 43s. for 17½ per cent. beets. Of the remaining factories, Peterborough, a member of the Bury group, paid 39s. per ton. The Anglo-Dutch group, under their open contract referred to in the last report, paid on account of their net proceeds to date, pending the auditor's certificate as to the final results, 45s. (Cantley), 35s. (Kelham), 45s. (Ely), 41s. (Ipswich), and 41s. (King's Lynn) on the same basis of sugar content.

The Present Season

In the present season (1932) the price fixed by 13 of the factories, by negotiation with the National Farmers' Union, is 40s. for factories in the Eastern Areas and 42s. in the Northern and Western Areas on the basis of 15½ per cent. sugar content, *i.e.*, 45s. and 47s. per ton respectively for 17½ per cent. beets. The Anglo-Dutch group offered a contract on a co-operative basis, which has been very favourably received in four of their five areas. Under their contract no price is fixed in advance, except guaranteed payments on account of not less than 35s. per ton of 15½ per cent. sugar content (*i.e.*, 40s. for 17½ per cent. beets), but the ultimate net proceeds of manufacture of white sugar (less Excise duty) and by-products from the beets delivered together with the subsidy will be divided between the growers and the factory in the proportion of 4 to 1, charges for depreciation, directors' fees, dividends or appropriations to reserves being borne by the factory's fifth share.

Under the British Sugar (Subsidy) Act, 1925, the audited balance sheets of the factory companies made up to March 31 each year are presented to Parliament. The last issued White Paper, containing the balance sheets of the 15 factory companies, operating 18 factories, as at March 31, 1931, and covering the manufacturing season of 1930, was issued on July 22, 1931.

March 31, 1931, marked the termination of the first seven of the ten years' subsidy period. The reduction of the subsidy by 50 per cent. applied to last season's crop, the results of which are not yet known. In this period of seven years there has been created, within less than a decade, an agricultural asset of great value. This asset, says the report, comprises a large and live organisation, both industrial and agricultural, which influences the greater part of the arable areas of this country. Its basis is 18 modern factories, which have reached a level of efficiency comparable with foreign standards; a team of 40,000 experienced growers; a source of employment in field and factory (as calculated in the Ministry's Report and quoted in the Report of the May Committee) of 8⅔ man years for each 100 acres of sugar beet grown. The organisation is fully equipped for continued service to British agriculture when a highly industrialised nation has learnt to recognise the necessity of a prosperous countryside and a virile agricultural population.

The sugar beet industry has been subject to close examination in the annual debates in Parliament when the subsidy has been voted each year, and in no country in the world have the facts and figures of the industry been so fully disclosed to the public.

Imports from the Empire

Despite the development of the industry in this country, it supplied during 1930 only about 18 per cent. of the quantity of sugar available to the home market. Of the imports 72 per cent. was obtained from foreign countries and 28 per cent. from the Empire. Sugar beet can be successfully grown in every county of England, most counties of Wales, and certain counties of Scotland, but under the most favourable conditions the British industry would be incapable of supplying more than 30 per cent. of the consumers' needs, or substantially less than the quantity which prior to the 1928 Budget used to be imported annually from foreign sources in the form of sugar ready for consumption. The remaining 70 per cent. would still be available for refining in this country and could include a greater quantity than at present of imports from the Empire in replacement of raw sugar from foreign sources.

The abnormal position of the world market for sugar which governs the home-grown sugar price, and therefore the beet price in all countries, bears most heavily upon the sugar beet industry, as its raw material is not purchased in the world market. This is the main embarrassment of the sugar beet industry to-day, which, in consequence, has caused a certain number of the factories to represent their difficulties to the Government.

Resolution Sent to the Government

The Society passed the following resolutions and sent copies to the Government and to the Press:—October 30, 1931.—"In view of the changed conditions and the urgent need for raising revenue, this Society supports the principle of increased Customs Duty upon imported foreign sugar, but so that any new preferential rates on Empire sugar will maintain the home industry and attract new capital for the establishment of additional beet sugar factories in Great Britain." November 25, 1931.—"This Society respectfully urges on the Government the vital need for an immediate pronouncemnt of its policy relating to the future of the sugar beet industry to enable growers to contract and prepare their land forthwith for a largely increased acreage of sugar beet, thus avoiding the unfortunate results which delay will occasion."

No pronouncement was made by the Government at that time, nor did the Minister of Agriculture at a later date, namely February 11, 1932, refer to sugar beet in his announcement of the Government's agricultural policy. On the other hand, however, the Ministry has informed the factories that the whole question of Government assistance to the industry is under consideration, and on February 29, 1932, the Chancellor of the Exchequer informed Parliament that the industry was forming the subject of inquiry by a Departmental Committee for the information of Ministers.

The Society has watched with interest the development of the educational efforts by the beet sugar factories from year to year through their experienced agricultural organisations, and has noted with satisfaction the education and research work in connection with the industry conducted by the Ministry of Agriculture. The education and research programme of the Ministry of Agriculture is in three parts:—(*a*) Regional prizes to sugar beet growers and their agricultural workers; (*b*) demonstrations and demonstration lectures, and (*c*) experiments.

The list of successful growers under the regional prize section (*a*) of the programme for last year was published in "The Times" on February 15, 1932, and showed the high yield and sugar content which could be obtained in all areas, comparing most favourably with foreign standards. (The prizes and the championship cup were presented at a meeting arranged by the Ministry prior to the luncheon).

The demonstrations and demonstration lectures (*b*) are planned upon the principle enunciated by the Agricultural Tribunal of Investigation:—"The farmer learns by seeing and imitation," and is, therefore, best taught by practical demonstrations on a commercial scale rather than by statistics of experimental plots. This principle is being developed further in the Ministry's programme for the present year, which is being supported financially and otherwise by all the factories. The third section (*c*)—experiments—includes: (*a*) Trials with different varieties of seed to test their comparative results under British conditions. These trials are carried out at various centres under the direction of the National Institute of Agricultural Botany. (*b*) Manurial trials to obtain by comparative tests information as to the best manuring programme under various conditions of British climate and soil. These trials are being carried out under the direction of the Rothamsted Experimental Station, Harpenden. (*c*)Experiments in feeding with dried pulp, both plain and molassed, the reports of which, recently published in the Ministry of Agriculture's "Journal," have been gratifying. Experiments in mechanised cultivation are also contemplated, and a scheme is being worked out by the Institute of Agricultural Engineering at Oxford.

Influence of the Film

An efficient and instructive film, illustrating sugar beet cultivation and beet sugar manufacture, has been prepared by the Lincolnshire Sugar Co., under the supervision of Mr. Beacon, managing director. This was shown to a large and enthusiastic audience at the Tivoli Theatre on July 2, 1931, and also later at Bush House, and is being used for educational purposes in different parts of the country.

The Mason Challenge Cup, together with a souvenir gift cup, is awarded to the competitor who delivers the best crop of sugar beet grown on 5 acres or over. Mr. Mason generously offered silver medals to those growers whose crop in sugar per acre is within 5 per cent. of that of the winner. Messrs. Jesse Crumpler and J. M. Scott acted as judges for the eighth successive year. The Mason Challenge Cup (and souvenir gift cup) has been awarded to John Wright, of Spalding, for a crop of 15.7 tons per acre with 18.2 per cent. sugar content, the sugar per acre being 2.86 tons. Silver medals have been awarded to A. Deptford, Wisbech, S. C. Kettley, Saffron Walden, and J. Thomas, Rhoscrowther.

The Countess of Denbigh Trophy is awarded to the competitor who delivers the best crop of sugar beet grown on 20 or more acres. Mr. Crumpler and Mr. Scott consented to act as judges, and awarded the trophy to S. C. Kettley, Saffron Walden, for a crop of 20½ acres, yielding 14.35 tons per acre, having a sugar content of 18.7 per cent.

Remote Prospects of Coal Hydrogenation

The Present Mining Depression

MR. C. AUGUSTUS CARLOW, in his presidential address to the Mining Institute of Scotland at its fifty-fourth annual meeting at the Royal Technical College, Glasgow, on Wednesday, April 27, said every country was now endeavouring to rectify its balance of trade by restricting imports, and unfortunately the coal trade was carrying more than its share of this disability. It naturally followed that the carrying trade, by land and sea, was materially reduced in volume, and their good customers, railway and shipping companies, found their requirements greatly reduced and their ability to pay a remunerative price for coal supplies severely curtailed. Depression restricted enterprise and traders generally had no confidence, all of which helped to deepen the general downward tendency. In these circumstances, inventive capacity had not been absent. Many minds had worked along the line of making better use of the natural product.

The "Coalite" process of twenty-five years ago was modernised and reappeared, modified and improved in many details, but hitherto had done little or nothing to bring relief. The inventors of the various processes, and the supporters of them financially, deserved the sincere gratitude of the mining industry. Their efforts were worthy of all praise. The spirit of research and enterprise had been most active and would, it was hoped, reap a rich reward in the near future, but, for the present and immediate future, the coal trade must look elsewhere for material prosperity. Quite recently the Salerni process had been brought to this country backed, most patriotically, by solid financial support. Everyone wished it all possible success, but time was required for its development, and meantime the needs of the coal trade were very pressing.

Great progress had recently been made towards perfecting the production of petrol from coal. Imperial Chemical Industries, Ltd., had earned the gratitude of the whole country, as well as that of the mining industry, for its enterprise in connection with this process. The company had recently printed a booklet giving a clear and complete account of the most recent developments in regard to both the technical and the commercial sides of the question. Schemes had been prepared for a plant to produce some 210,000 tons per year of petrol, out of the country's consumption of 3,000,000 tons per annum. According to the booklet, petrol could be retailed, including reasonable profit, at present-day petrol prices. The plant would consume 760,000 tons per year of coal and give employment to 5,000 or 6,000 men (including miners). Under present world economic conditions, none of the usual methods of providing industrial capital were available for furnishing the amount necessary for an enterprise of this magnitude.

Mr. Carlow said it was understood that such a plant would cost some £8,000,000. In view of this authoritative announcement, it seemed clear that some time must elapse before any really considerable proportion of the country's coal output could find profitable use in this process, and something immediate was necessary. The use of raw coal in pulverised form had progressed in conjunction with steam boilers at sea, on land, and to some extent on locomotives. Coal in this form might be easier handled by being injected through pipes by means of compressed air, and the bunkering of steamers at coaling stations by such means instead of the antiquated methods still frequently followed, would have distinct advantages in the matter of cheapness and cleanliness, both of which were important. The present tendency, however, was to deliver the coal in lump or unscreened form to the boilers and grind it as near the boiler furnaces as possible.

The Minister for Mines recently stated, in reply to a question in the House of Commons, that the total number of installations for steam-raising in this country amounted to 82, and that the quantity of pulverised fuel consumed in electric power stations amounted to 700,000 tons for the year ended March 31, 1930, which tonnage represented about 7.7 per cent. of the total fuel burned in electric power stations of the country. This did not include pulverised fuel used for purposes other than steam raising, in regard to which no detailed information was available. In so far as coal in this form retained markets which might otherwise be lost, the coal trade welcomed most heartily the development of the process, and assisted in every way possible. The coal trade, however, needed something more universal and more immediate, to help it out of its difficulties.

A New Colorimetric Test for Chromium

By G. C. SPENCER

The following colorimetric test is reprinted from the April issue of the Analytical Edition of our American Contemporary "Industrial and Engineering Chemistry." The author is associated with the United States Bureau of Chemistry and Soils at Washington.

WHILE searching for methods of determining minute quantities of chromium, the writer recalled a dyeing technique in which woollen fibre coloured with certain acid dyestuffs is given a subsequent treatment in a bath containing potassium dichromate and sulphuric acid. In many cases this after-chroming effects a distinct colour change on the woollen fabric and greatly increases the fastness of the colour. This technique suggested a possible method for the detection of small quantities of chromium by warming previously dyed wool samples in acid solutions that were known or believed to contain chromic acid. Preliminary experiments were accordingly made on woollen yarn that had been dyed with 1 per cent. of Serichrome Blue R with results which justified further experimentation. This dyestuff, Serichrome Blue R, despite its name, imparts to wool a bright crimson colour with a faint bluish tinge. The deep navy blue shade of the finished wool is developed by chromic acid in the second bath. No other dyestuff seemed to offer any advantages over this for analytical purposes. It is possible that some other dye would be better for quantitative results.

Preparation of Colour Standards

For this work wool flock (finely ground wool) was used, although woollen yarn may be used if preferred. The dyestuff solution was made by dissolving 100 mg. of Serichrome Blue R in water and making up to 200 cc. The dyeing operation was carried out in the following manner: To a 125-cc. Erlenmeyer flask were added 40 cc. of water, 0.1 gram of sodium sulphate, and 0.02 gram of sulphuric acid. (The quantities of sodium sulphate and sulphuric acid added represent 5 per cent and 1 per cent., respectively, of the weight of the wool taken.) Two grams of the wool were added and the flask was shaken to ensure thorough wetting of the fibre. The desired quantity of dyestuff was then added (0.5 per cent. is recommended—*i.e.*, 20 cc. of the solution). The mixture was stirred well and heated at full temperature of the steam bath for 30 minutes, after which it was filtered on paper by suction in a Büchner funnel, washed free of acid, and dried.

The colour standards were prepared as follows: A standard chromium solution was made by dissolving 0.282 gram of potassium dichromate in water and making up to a volume of 100 cc. (1 cc. of this solution contains 1 mg. of chromium as Cr.) From this solution a working standard containing 0.01 mg. of chromium in each cc. was made.

To each of ten beakers were added 50 cc. of water, 3 cc. of 1*N* sulphuric acid (not standardised), and 0.1 gram of wool previously dyed with Serichrome Blue R. The mixture was stirred to ensure thorough wetting of the fibre and such quantities of the potassium dichromate solution as represented from 0.01 mg. to 0.1 mg. of chromium were added to the respective beakers, which were then covered by watch glasses. The mixture was heated on a steam bath at full temperature from 20 to 30 minutes with occasional stirring, filtered by suction paper (small Büchner), washed, dried, and mounted on a spot plate in Duco household cement thinned down with an equal quantity of amyl acetate. The wool samples thus treated were found to have developed a blue shade in proportion to the amount of chromium which acted on the dyed sample.

Procedure in Examining Samples

To test for chromium in unknown samples, separate the chromium, ferric iron, and aluminium in the form of hydroxides. Filter by suction in a Gooch crucible provided with an asbestos mat (preferably on a removable disc) and wash with water. Remove the asbestos with the precipitate to a beaker and add 30 cc. of water and 3 cc. of normal sodium hydroxide solution. Mix well and add 5 cc. of hydrogen peroxide solution. Allow to stand about 30 minutes, and then warm on a steam bath until hydrogen peroxide is decomposed. Filter by suction and acidify the filtrate with 3 cc. excess of normal sulphuric acid, add while stirring 0.1 gram of dyed wool, and heat the covered beaker on the steam bath from 20 to 30 minutes. Filter by suction on paper, wash, and dry. The presence of chromium is indicated by the development of a blue shade on the red fibre. If this colour is not too dark the quantity of chromium may be estimated by comparison with the chromium colour standards described above.

Confirmation of the method as here presented was made by comparing the colours developed by potassium dichromate solutions with those produced by chromic chloride solutions after oxidation. Both solutions, potassium dichromate and chromic chloride (solution A), were adjusted to contain 0.01 mg. of chromium in 1 cc. The first colour standards represented 0.05, 0.07, 0.10, and 0.12 mg. of chromium respectively, besides a blank. In the first case chromic chloride alone was used, in the second case the chromium solutions contained an admixture of ferric alum and alum. Fair duplication of solution A colours with those made by potassium dichromate was observed in all cases. More complete tests were then made using solution A in amounts that varied from 0.01 to 0.10 mg. of chromium, with checks that were invariably satisfactory. These results confirmed a number of tests that were obtained in earlier experiments.

Colour Changes

It is of interest to note that chromium-developed wool samples may be stripped of their red colour by warming with dilute alkali solution (0.1 *N* sodium carbonate) without removing the chromium stain. These stains are proportional to the quantity of chromium present. In order to ascertain if the colour development herein described is characteristic of chromic acid, parallel experiments were tried on woollen yarn dyed with Serichrome Blue R using the following acids and salts in amounts equivalent to 1mg. of metallic chromium: molybdic, tungstic, vanadic, and permanganic acids; also ferrous sulphate, manganous sulphate, and chrome alum. No change in colour was observed.

The Royal Institution

Lord Eustace Percy Elected President

THE annual meeting of the Royal Institution of Great Britain was held on May 2, Sir Robert Robertson, treasurer and vice-president, being in the chair. The annual report of the committee of visitors for 1931 referred to the completion of the alterations to the building, and said that in safety and suitability for the purposes for which it exists, in completeness of equipment, and in speciousness and beauty, the house of the Institution now compared favourably with any in London. The principal activity of the Institution during the year had been the share it had taken in the arrangement of the Faraday celebrations, which had proved an impressive and remarkable demonstration in honour of the memory of a great man.

During the year 67 new members and fourteen associate subscribers had been elected, and 17 new honorary members had been added to the roll from among the distinguished foreigners who attended the Faraday celebrations. Thanks were voted to the officers and to the committees of managers and visitors for their services during a period of great activity in the history of the Institution.

The following were unanimously elected as officers for the ensuing year:—President: Lord Eustace Percy; treasurer: Sir Robert Robertson; secretary: Major Charles E. S. Phillips; Managers: Sir Frederick Berryman, Sir John Cadman, Dr. Ernest Clarke, Sir James Crichton-Browne, Professor Alfred Fowler, Sir Robert Hadfield, Dr. K. R. Hay, Mr. J. S. Highfield, Sir Arthur Keith, Sir William Larke, Lord Luke of Pavenham, Mr. Charles H. Merz, Sir Richard Paget, Mr. H. M. Ross and Dr. G. C. Simpson; Visitors: Dr. C. V. Drysdale, Dr. J. J. Fox, Professor G. E. Gask, Mr. Arthur Jaffe, Dr. G. W. C. Kaye, Mr. James Kewley, Mr. Arthur Marshall, Mr. Emile S. Mond, Professor A. O. Rankine, Dr. Russell J. Reynolds, Mr. T. H. Sowerby, Major W. S. Tucker, Professor A. M. Tyndall, Admiral C. V. Osborne and Mr. H. E. Wimperis.

Preparation of Orange-Tinted Red Lead

The Technique of Manufacture

In the present-day manufacture of red lead, more attention has to be paid to the tint of the finished product, as the oxide is now bought because of its colour, which may be demanded in a variety of different tints. So far as the preparation of ordinary red lead is concerned, the process does not appear to have varied much from the practice adopted some fifty years ago, although on the Continent, and more recently in this country, a new system has been introduced which is still worked in a comparatively small way.

Ordinary red lead is prepared by melting charges of 45 cwt. per shift, using lead containing a small proportion of antimony. The furnaces used are coal-fired reverberatories, furnished with hearths of a bowl shape, the maximum depth being little more than six inches. The first operation consists of flapping the lead continuously so that it gets well exposed to the oxidising influence of the air. One man performs the duties of firing the furnace and flapping the lead, and the old style of flapping with a rabble attached to a chain suspended from the rafters is still used. As the mass gets converted to crude litharge, the yellow scum becomes so considerable that it is necessary to adopt means to prevent it shielding the remaining lead from further oxidation. A rut, or path, is then cut across the mass from the working door wherein the last remains of the lead are allowed to collect. This lead is removed and added to the next day's charge. The crude litharge is then drawn on to the floor, and ground and levigated to remove the particles of metallic lead.

The wet litharge is charged directly through hoppers into the red lead furnaces. These are coal-fired reverberatories similar to the litharge furnaces, but the temperature has to be maintained with greater accuracy. A recording pyrometer is used to keep a record of heat employed which is between 500 and 600° C. The heat is maintained for about three days, and in some cases the mass is allowed to cool down in the furnace to ensure the desired colour being formed. Accuracy of temperature and conditions are imperative or the whole charge will be wasted. In some cases, a difference of 10° above the pre-arranged figure would spoil the colour and simply return the mass to litharge, whilst the same difference below the temperature would act similarly. In furnace practice, however, it has been found impossible to convert litharge to the higher oxide beyond a fixed figure. White lead when heated in the same furnace, gives a pure orange product.

Both orange and red leads have to be again levigated prior to marketing, so that it is customary to mix the proportions of white lead and litharge to produce the desired final tint before firing. From experience it is known exactly what proportions are required to produce all the tints varying from dark red to bright orange, according to the demand which arises. After the final levigation, the product is packed in strong casks lined with lead foil ready for the market. Numerous attempts have been made to convert red lead directly into orange lead, but none of these, so far, appear to have shown the rapidity or accuracy of tint accorded by the white lead.

Annual Meeting of the Ceramic Society

Some Technical Problems of the Potter

The annual meeting of the Ceramic Society was held at the North Staffordshire Technical College on April 25, when Mr. D. F. W. Bishop, the retiring president, occupied the chair.

Mr. Bishop gave a review of the past year's work and pointed to the growing enthusiasm in the parent society and the sister sections. Speaking particularly of the pottery section, he emphasised the need for further research in the direction of eliminating silicosis.

Colonel Alan Stein, of Bonnybridge, Scotland, was elected president on the motion of Mr. W. J. Gardner, seconded by Mr. G. A. Hodson.

Thanks for past services were accorded to Mr. Garlick on his retirement from the chairmanship of the Refractory Materials Section.

The Question Box

At an ordinary meeting which followed the annual business, a range of technical questions was discussed.

Mr. J. Hargreaves, replying to a question as to the maximum amount of soluble salts that can safely be allowed in slip house water and as to the effects of such salts, said a great deal of work had yet to be done on that subject. Dr. J. W. Mellor himself recognised this when, in 1906, he showed, by three illustrations, how the quantities of soluble salts may vary according to the particular methods of clay preparation employed. In view of the variations in the methods ruling, it was virtually impossible to set down a definite limit for the amount of soluble salts allowable in slip house water. To begin with, the sources of the soluble salts demanded consideration. The salts might be of the calcium variety, derived from the water; they might come from the ball clay or china clay; they might be a legacy of the scrapings of the plaster moulds, or of old scraps of casting slip; they might be cobalt chloride—the product of soluble cobalt stain; or they might come from creosote left in imperfectly cleansed presscloths.

Varying apportionments of the salts in relation to the added alkali would result in a more or less fluid slip, since the action of the alkali would be speeded up or retarded thereby. Another point to consider was that marked differences of results would accrue from the interaction of the soluble salts of two different clays. It was essential to avoid running into these variations when producing pottery by means of casting slips.

Mr. N. Wilson replied to a question inquiring how it was that, in the milling of china stone, cases arose where the stone would not settle in the wash-tub after 2½ hours, although under normal conditions of working the first plug could be liberated after ten minutes' settling. The results, Mr. Wilson suggested, indicated that there must be some coagulating agent present. It might be that, although the water used showed only a mere trace of alkali, an appreciable amount of lime-stone came to be introduced during the grinding. A case was known where a pottery miller, who used canal water from one particular part of the district, met with trouble through tardy settling, whilst the same trouble was not experienced when using the canal water from another part of the district. The cause was traced eventually to the alkalinity of the water, and when a little acid was introduced the offending trouble disappeared.

So'uble Salts

Mr. S. R. Hind, in reply to a question as to whether the use of a soluble salt, such as cobalt chloride, was an improvement upon the older type of calcined oxide used for body staining, observed that there was much to be said for soluble cobalt salts as a means of correcting the natural yellowish tint of pottery bodies. An insoluble stain, no matter how finely it was ground, could not, at best, disseminate the cobalt atoms as evenly as could be done by means of a solution. Furthermore, soluble cobalt stains were cheaper than stains that were calcined and ground, and they had given entire satisfaction in practice over a very long period.

Mr. G. H. Viggars replied to the questions "What weight per pint of glaze is found to be most suitable in the cylinder grinding of glazes; and what cylinder speed is recommended?" He said that the weight per pint varied with the type of glaze used—lead or leadless, as the case might be. In the case of a leadless glaze, before water was added, the pint weighed about 36 oz.; but it was heavier with a lead glaze. As to the speed of the cylinder, this would vary according to the size. The usual speed for a 7 ft. cylinder was 19 revolutions per minute, and for a 5 ft. 6 in. cylinder 24 to 25 revolutions per minute.

The Menace of Chemical Warfare

Chemical Workers' Union Issues a Public Warning

MR. ARTHUR J. GILLIAN, general secretary of the National Union of Drug and Chemical Workers, has written a pamphlet on "The Menace of Chemical Warfare to Civilian Populations," designed not only to reach the members of the Union, but also to be purchased by the public at twopence per copy. The first issue of 10,000 copies was sold before it was off the press, and it is expected that something like 250,000 will ultimately be circulated.

Mr. Gillian, in an introductory note, emphasises the importance of the public having the fullest information on this vital question. Generally speaking, he says, a "hush-hush" policy is maintained. When the question is discussed, international experts appear to create an impression in the public mind that chemical warfare is not so terrifying, horrible or gruesome as the anti-chemical warfare experts claim. The pamphlet sets out in simple terms some of the most important conclusions of chemical warfare experts—both for and against—indicating what chemical warfare would mean to civilian populations.

The author produces evidence to show that, in spite of agreements to the contrary, every nation is experimenting with a view to employing poison gas and kindred methods in war. The defence of London air manœuvres, in 1928, showed the result that a raiding squadron had theoretically wiped out London, leaving it a city of the dead, shattered and burning.

Lord Halsbury, who was Assistant Inspector of High Explosives during the war, says of mustard gas: "For an area, say Richmond to Barking and Finchley to Streatham, an effective lethal dose would be only 12 tons. Within 12 hours every man, woman and child in that area might be dead." The development of aviation has made it certain that future wars will largely be waged by means of attacks on the civilian populations of the combatants.

Attacks from the Air

Mr. Gillian argues that no defensive measures can protect the world's great cities from air attack. Even if half the attacking machines are brought down, the rest can still devastate a great city or an entire countryside. If only one aeroplane laden with poison gas bombs gets through, it can do in a few minutes more damage than all the air raids on London during the great war were able to achieve. Reprisals simply mean inflicting the same horrible tortures and mass slaughter on the civilian population of the enemy. Great Britain's experimental "gas farm," at Porton, near Salisbury, tries out poison gases on young soldiers, who are persuaded by extra pay to volunteer for "dangerous duty." Three hundred and seventy-two such experiments have been conducted since the "gas farm" was established, which so far have fortunately not resulted in any deaths.

The activities at Porton include tests to ascertain the irritant action on the skin of certain compounds, tests to ascertain physiological properties of certain gases, and tests of gas masks.

The pamphlet points out that £134,000 a year of the British taxpayers' money has been devoted to this purpose, since 1926.

At Edgewood Poison Gas Arsenal in the United States, there were 925 casualties in seven months, 647 being in the mustard gas-making sections. Authorities of all countries are agreed that poison gas will be used in the event of another war, whatever stipulations may exist to the contrary.

Thus, Brigadier-General Fries, of the U.S.A. Chemical Warfare Service, wrote in the "Royal Engineers' Journal" in 1922: "Poisonous gases in the world war proved to be one of the most powerful weapons, and for that reason will never be abandoned." Factories that may be converted at short notice into arsenals of deadly poison gas include those dealing with acids and alkalis, fine chemicals, coal-tar by-products, drugs, paints and varnishes, soap, artificial silk, petroleum refining, and many others.

Even the seemingly innocent beet sugar industry (heavily subsidised by the British Government for many years for no economic reason that has been made clear) is a potential source of glycerine, alcohol, acetone, and hydrocyanic acid, for gas and explosive manufacture.

In Great Britain, chemical supplies for munitions, explosives, and poison gas are almost entirely in the hands of vast combines. These combines have immense influence on public affairs and political questions. Their shareholders include Cabinet Ministers, country parsons, all types of investor, who, knowingly or unknowingly, are investing their money in the manufacture of death in its most horrible form. The chemical industries of the world are prospective arsenals, and the closest relations exist behind the scenes between governments and chemical manufacturers.

Appalling Distress and Misery

Quoting Professor J. B. S. Haldane, Mr. Gillian says of sternutator gases (gases affecting the chest): "The symptoms . . . . are most curious. They cause victims to have terrific pains in the head and chest. . . . These symptoms are accompanied by the most appalling distress and mental misery. Soldiers poisoned by these substances have to be prevented from committing suicide—others went raving mad and tried to burrow into the ground to escape from imaginary pursuers."

Of mustard gas, he says: "It vapourises slowly at ordinary temperatures, and ground contaminated by it will be dangerous to occupy for lengthy periods. Men, women and children unknowingly getting M.G. on their clothing and carrying it into a warmer atmosphere endanger themselves and others. The chief horror is that the victims do not know that they are infected until some hours after. After a few hours, the victim's eyes begin to smart, and sneezing develops, followed by nausea, reaching and vomiting. Eye trouble increases, and inflammation of the skin commences on the face, neck, under the arms and inside the thighs. Intense itching sets in, which prevents sleep. The rash has now developed into blisters and open festering sores. At the end of 24 hours, the victim is virtually blinded. Acute bronchitis now sets in with heart strain, death usually occurring on the third or fourth day."

No power in earth, concludes Mr. Gillian, can prevent substances such as these being showered on defenceless cities in another war. Gas masks, gas-shelters for the entire population are alike impracticable. Disarmament is the only way out for humanity, coupled with a united refusal of the workers to make instruments of war.

Jealott's Hill Research Station

Open Invitation to Visitors

THE programme of experiments to be carried out during the coming season at Jealott's Hill, the agricultural research station of Imperial Chemical Industries, Ltd., at Bracknell, near Maidenhead, Berks, promises to be of special interest to all concerned in British farming. It includes experiments dealing with the most profitable methods of using fertilisers to increase the yields and quality of grain, root and green crops, and also with the intensive management of grassland in all its aspects, including the improvement of pasture awards by timely grazing and resting, the comparison of four alternative systems of feeding a dairy herd both in and out of doors, and various methods of conserving surplus grass for winter fodder.

The demonstrational small holding, which provides a practical example of the help which fertilisers can give the dairy farmer, has entered its second season and the results of the first year's working cannot fail to interest land owners and estate agents. Experiments are also in progress on the chemical treatment of lawns, golf greens and fairways, and on the manuring of fruit and vegetables.

The station is visited every year by an increasing number of people both from home and overseas and an open invitation is extended to all interested in agriculture to inspect the experiments now in progress and to study for themselves the practical lessons so learnt. Visitors are the guests of the station at lunch or tea but it is desirable that two or three days' notice should be given of an intended visit.

Society of Chemical Industry

Annual Meeting Programme

Nottingham Arrangements

ARRANGEMENTS are well in hand for the 51st annual meeting of the Society of Chemical Industry, which is to be held at Nottingham on July 12-15. His Majesty the King has graciously granted his patronage to the meeting, and the preliminary programme has been issued by Mr. W. T. T. Ainsworth, secretary of the Nottingham committee. Following are details of the programme:—

Tuesday, July 12.—8 p.m. to 1 a.m. Reception in the University, dancing, refreshments.

Wednesday, July 13.—At the University: 10 a.m. Council meeting; 10.30 a.m. welcome by civic and college authorities in Great Hall; president's address; 1 p.m. Nottingham Section invitation lunch; 3 p.m. reception by chairman of College Council and Principal; inspection of buildings, science department, library; tea; dancing; 7.30 p.m. for 8 p.m. civic reception, Town Hall.

Thursday, July 14.—University, Great Hall. Presentation of Messel Medal and address by Sir William Pope; 12 to 12.15 visit to Stanton Ironworks; lunch and tea provided; 2.30 p.m. works visits or drive through Dukeries, visiting Welbeck; 7.30 p.m. for 8 p.m. annual dinner.

Friday, July 15.—10.30 a.m. all-day visit to Staveley Ironworks; 10.30 a.m. alternative visit to Newstead Abbey, returning for lunch; 2.30 p.m. works visits.

Works visits on Thursday and Friday include those of Messrs. Boots (new works); Birkin; Lewis; Stanley Bourne; Raleigh Cycle Co.; Rolls Royce and Co.; Player's; Manlove Alliott; Barnstone Cement Co. The last named is associated with a drive through Belvoir Woods.

London Section

Annual Meeting

AT the annual general meeting of the London Section, which was held at Burlington House on Monday, May 2, Dr. Monier-Williams was re-elected chairman and Dr. H. E. Cox hon. treasurer. To fill three vacancies on the committee, Dr. G. D. Bengough, Mr. J. Davidson Pratt and Mr. F. A. Greene were elected in succession to Dr. R. T. Colgate, Dr. R. Lessing and Mr. S. G. M. Ure.

Following the annual meeting the usual monthly meeting of the Section was held when a discussion took place on "Smoke Abatement in Industry."

Mr. E. C. EVANS, who opened the discussion, said the most important technical problems involved in smoke abatement in industry were probably those of the iron and steel industry. Considerable progress had been made in the ten years since the Smoke Abatement Committee in 1921 issued its report and the questions which might now be considered were whether it is now practicable to manufacture economically all grades of steel without smoke, and secondly, if a smoky atmosphere is still essential in the manufacturing process, is it economically possible to eliminate the soot before the products of combustion enter the atmosphere. As the result of an investigation made by himself and Mr. F. J. Bailey in 1929 the vital importance of non-scaling atmosphere which made the absolute prevention of smoke difficult, if not impossible, when coal was used as a fuel was impressed upon him. Various methods, however, of mitigating smoke had been adopted by the manufacturers, such as the utilisation of secondary air, increasing the uniformity of coal fuel, and in the larger works, the adoption of producer gas firing. Consideration had been given by a number of manufacturers to the possibility of treating exit gases from furnaces for the absorption or elimination of the smoke prior to its passage into the atmosphere, but under the conditions of Sheffield furnaces any solution in this direction other than that of burning the smoke in the furnace itself was obviously uneconomical.

Problems Within Sight of Solution

Whilst the individual works were doing a great deal, there were still a number of problems which required co-operative investigation and the manufacturers, together with the local authorities were forming, jointly, a research committee which was assisted by a grant from the Department of Scientific and Industrial Research through the Iron and Steel Industrial Research Council.

Mr. H. CLIFFORD ARMSTRONG (Firth and John Brown, Ltd.) said that as a fuel technologist he was satisfied there was no smoke problem at all and that it was possible in Sheffield to make steel without smoke. He did not suggest, however, that this could be done with the existing coal-fired furnaces and the problem was that steel manufacturers could not afford at the moment to convert their furnaces. Although the manufacturers were working with the local authorities on the joint research scheme, it was difficult, when a large number of people with conflicting interests got together, to make very rapid progress. It could be claimed that several firms in Sheffield at the moment were five years ahead of the Research Committee and had solved quite a number of the problems. For instance, at the present time stainless sheets 4 ft. by 12 ft. were being made there, for the first time, using gas at 2.4d. per therm, the cost of manufacture being equal to that when coal was used. At the same time, it was not possible to make these sheets economically at the present moment with gas at 2.4d. The point which he urged upon chemists was that they should help in the application of secondary air for, to all intents and purposes, burning the gas completely.

Limit of Sulphur Concentration

Dr. J. S. OWENS said the fixing of a standard of permissible sulphur emission was a problem on which there might be considerable difference of opinion, depending upon whether we looked at it from the point of view of a power station engineer or a member of the public. He suggested that if a limit of sulphur concentration were imposed for flue gases of 0.01 grain per cu. ft., it would be a reasonable standard but doubtless very difficult to attain.

Dr. R. LESSING said that sulphur was the most insidious constituent of smoke. The major portion of it left the chimney in the form of acid which had a profound influence on fog production, but in the case of large power stations this was now being removed by the application of steam and certain chemical agencies. The emission of sulphur could be overcome by two methods, one being to get the sulphur out from the fuel either by selection—which was very difficult—or by the removal of the pyrites, and the other was by the extraction of the sulphur oxides from the flue gases. This extraction could now be carried out with an efficiency of about 95 per cent. where the plants were sufficiently large to justify the installation of an extraction unit. Such extraction plants brought the content of SO_2 down to 0.02 grains per cu. ft., which was a figure acceptable to the local authorities at the present time although it was double the amount Dr. Owens would like. When the enormous amount of sulphur was taken out of the atmosphere by such means the other part of the smoke problem would be very much easier to deal with.

American Section

New Officers Elected

AT a recent meeting of the executive committee of the American Section of the Society of Chemical Industry, the following nomination were made for officers to serve during 1932-33: Chairman, A. E. Marshall; treasurer, J. W. H. Randall; secretary, Foster D. Snell; members of executive committee: Arthur W. Hixson, W. W. Winship, Harlan S. Miner, Gustavus Esselen and W. D. Turner.

A meeting of the Section will be held jointly with the American Chemical Society, the Electrochemical Society and the Société de Chimie Industrielle on May 13, at the Chemists' Club, New York. Mr. Edgar C. Bain, of the United States Steel Corporation, will read a paper on "Some Fundamental Characteristics of Stainless Steels." Mr. Bain will discuss the role of the most important ingredients of stainless steels, chromium, in respect to its effect upon the electrochemical properties of its alloys in iron and in respect to its influence on the grain structure of the metal. The structure of some of the stainless steels which contain elements in addition to chromium will be considered in reference to the specific enhancement of some of the properties. In particular, the roles of carbon and nickel will be described in detail.

SIL-FOS
BRAZING ALLOY

Have you had particulars of this remarkable brazing alloy containing silver

SIL-FOS
BRAZING ALLOY

Is easy to use
Works fast
Flows freely at 1300° F
Requires less flux
Penetrates quickly and thoroughly
Can be used in many cases for joining brass, bronze, nickel, nickel silver, extruded brass and bronze, and other metals and alloys fusing above 1300°F

Send at once for descriptive booklet S.F.3 to the sole manufacturers in England

JOHNSON MATTHEY & CO., LTD.,
78 Hatton Garden, London, E.C.1

News from the Allied Industries

China Clay

THE British China Clay Producers' Federation, Ltd., was registered on May 2 as a company limited by guarantee, without share capital and with 100 members. The objects are to promote and protect the status and general interests of producers of china clay, and generally to watch over and assist the china clay industry, etc. The management is vested in an executive committee, consisting of two representatives from English China Clays, Ltd., one representative of Lovering China Clays, Ltd., one representative of H. D. Pochin and Co., Ltd., and F. Parkyn (Parkyn and Peters), T. Martyn (Lower Lansalson and Caudledown China Clay Co., Ltd.), J. Hoyle (Manchester China Clay Co., Ltd.), J. Morton (Hensbarrow United China Clays, Ltd.), E. J. Lewis (Mid-Cornwall China Clay Co., Ltd., the Newquay China Clay Co., Ltd., and Beacon Clays, Ltd.), and J. P. Goldsworthy (Goonvean and Rostowrack China Clay Co., Ltd.). W. Prescott is the first chairman. The registered office is at 21 Tothill Street, Westminster.

Food Canning

THE comparatively recent realisation of the possibilities of canning of British fruit, vegetables, milk, cream, fish, poultry, etc., is opening up a great new industry and offering a hopeful prospect for various branches of agriculture. Last year imports of canned foodstuffs amounted to no less than £25,000,000. Much of this large amount represents products of overseas farms, orchards, and seas with which we cannot compete for climatic reasons, but the possibilities of expansion for British canning are, nevertheless, very great. In the supply of metal containers for this industry the Metal Box Co., Ltd., is taking the leading part. The company operates eighteen factories throughout Great Britain, and produces apart from tins manufactured by packers themselves over half of the entire British output. The output of cans for the canning of fruit and vegetables has risen from 23,000,000 in 1930 to 65,000,000 in 1931, and the estimate for 1932 is 100,000,000. An issue of debenture stock and preference shares is now being made by the company.

Petroleum Industry

MR. EARL W. MAYO, head of an important group of American trade papers, and Mr. J. B. Kessler, joint managing director of the Royal Dutch Shell group, arrived in England on April 30 to investigate a scheme suggested by Mr. Kessler for the regulation of petroleum exports. Mr. Mayo told an interviewer that there was reason to believe it would lead to the adoption of some method of international stabilisation. There were encouraging indications of improvement in the oil marketing conditions. The folly of continuing to produce petroleum in excess of the world's needs and trying to force over-supplies on reluctant and saturated markets by selling below cost had been abundantly demonstrated, since the losses incurred by the important companies had reached staggering proportions. Mr. Mayo said that when he left New York two events of recent occurrence seemed to hold promise of betterment in the British petroleum market situation. One of these was the acquisition by the Standard Oil Company of New Jersey of the controlling interest in the Pan-American Petroleum and Transport Co., which, through a subsidiary, had been an aggressive competitor. The other was the statement by the Soviet oil authorities of their willingness to enter into conference for the consideration of such practical matters as the regulation of the volume of shipments. Both of these were constructive steps which should make it easier to amend the demoralising conditions that had prevailed. There was a good probability that the American Congress would approve the Bill now pending which provided for an inter-State oil compact, and that would pave the way for American participation in the movement for the inter-international stabilisation of industry. Mr. Mayo added that, as on many past occasions, the entire business world owed a debt of gratitude to the British nation and British business men for holding steady during a critical time when confidence in business institutions was badly shaken.

Rubber

THE directors of the Dunlop Rubber Co., Ltd., announce that, subject to final audit and after providing for depreciation, the profit for 1931 was £1,181,000, compared with £1,250,000 the previous year. The directors propose to pay a full year's dividend on all classes of preference shares, but do not recommend any dividend on the ordinary shares. Last year the dividend was 6 per cent. Current assets amount to £5,656,000, of which £2,820,000 are represented by cash and British Government and other securities.

Dyestuffs

RECENT tariff developments, added to the effects of the depreciation of the pound, have had a result which is unhelpful to business in the Lancashire cotton industry. The prices of British and Continental dyestuffs are rising, and already the increased cost has made it necessary for yarn-dyers to increase their processing charges. This is likely to cause an upward revision of the price basis both for dyed yarns and for the wide range of cloths—from dhooties to poplins—in which coloured yarn is used. In the piece-dyeing trade, however, there has been no increase of charges as yet, and dyers generally seem anxious to check any ill-effects which the higher colour prices might have on the competitive position of Lancashire's dyed piece goods. Calico printers, too, have so far refrained from raising their charges.

Glass Industry

ALDERMAN W. BRADFORD, of Dudley, the new general secretary of the National Flint Glass Makers' Society, states that a conference of employers and employed is being held to consider the state of the industry arising out of the decision of the Tariff Commissioners to reduce the abnormal duties on imported glassware from 50 to 20 per cent. All sections of the glass trade except the scientific and optical class were included, involving 25,000 workers. The employers, he said, had spent hundreds of thousands of pounds in preparing for a revival of trade in the glass industry, believing that the tariff would remain at least long enough for them to get their work going again. But the decisions of the Tariff Commissioners to reduce the amount of the tariff had resulted in the scouring of this country by foreign agents who were prepared to sell at a loss if they could again capture the British market.

Matches

THE examination of the American directors of the International Match Corporation in bankruptcy proceedings indicates that the company has no match monopolies, or interest in them, with the possible exception of a Turkish contract. The chief asset is a claim of $75,000,000 (about £15,000,000) against a continental investment company. No American auditors directly audited the statement of the latter in connection with the loan at the formation of the company.

SIR GEORGE PATON, presiding on April 28 at the annual meeting of Bryant and May, Ltd., at Bow, referred to the Kreuger crash. Bryant and May, Ltd., he said, made an arrangement in 1927 with the Swedish Match Co. whereby the former took over the business of the Swedish company in the British Empire, except in Asia. The British Match Corporation was formed, and the Swedish Match Company received 30 per cent. of the shares for their rights. Mr. Kreuger became a director of the corporation, but Sir George believed that Mr. Kreuger attended only two board meetings in the period that had elapsed. The shareholders would be gratified to know that neither the British Match Corporation nor any of its subsidiaries of which Bryant and May was the principal one had any holding or shares in any of the Kreuger group of companies. They made no loans or entered into any financial guarantees in regard to them. The directors were thankful that the company had not been involved in this financial debacle, and they assured the shareholders that they would watch events closely and do all they could to protect the interest of the company. They would use their experience in maintaining the match trade of this country and of the Empire on the high level to which it had attained.

Chemical Industry Lawn Tennis Tournament

Details of Draw for First Round

ENTRIES for the second annual Chemical Industry Lawn Tennis Tournament, promoted by THE CHEMICAL AGE in competition for the silver cup presented by the proprietors, closed on Monday last, and full particulars are given below of the draw for the first round, which is to be completed by May 30. We had to reject some entries owing to technical infringements of the rules, but a total of 46 pairs went into the hat for the draw, with the appended results. There are fourteen matches to be played in the first round and 18 pairs are awarded byes, in order to bring the number of pairs in the second round to a level 32. The chemical industry as a whole is to be congratulated on a much more enthusiastic response to the announcement of the tournament than was the case last year, when only 26 pairs entered. It is to be noted that last year's winners, S. Newman and E. J. Lawrence (London), have dropped out of the tournament this year, as also have the runners-up, S. B. Gane and D. E. Raine (Birmingham). While the withdrawal of such excellent players is to be regretted, there is consolation in the fact that their absence will give some of the weaker players a chance of reaching the later stages of the tournament.

Players are requested to read carefully the brief rules printed on this page and adhere to them, as failure to do so may lead to disappointment. Players must make their own arrangements for playing off their matches on a ground mutually agreed upon. In the event of disagreement, it should be pointed out that the first name drawn (that appearing on the left in each instance) has the right to choose the ground. All matches in the first round must be played off by May 30 and the results, signed by all four players (winners and losers) should be dispatched at soon as possible to the office of THE CHEMICAL AGE, Bouverie House, 154 Fleet Street, London, E.C.4. The last moment for receiving first rounds results will be 9.30 a.m. on June 1.

In conducting the draw, provincial entries have been dealt with separately from those in the London area to minimise as far as possible the inconvenience of travelling. Following are the rules of the tournament.

Rules

1. Every competitor must be a member of the chemical industry, either as a principal or a member of a staff. There is no entrance fee of any kind.
2. Each pair must be members of the same, or an associated, firm.
3. The Challenge Cup shall be competed for annually on courts of any surface in accordance with the Rules of Lawn Tennis and the Regulations of the Lawn Tennis Association. The winners of the Cup shall make arrangements for its safe custody and insurance.
4. The competition shall be conducted on the knock-out principle, and the best of three advantage sets shall be played in all matches.
5. Entry date (no longer applicable).
6. The dates on or within which the several rounds must be played will be published in THE CHEMICAL AGE.
7. The Editor of THE CHEMICAL AGE shall have the right to scratch any players who fail to play off their matches by the stipulated dates, or who otherwise fail to conform with the rules and regulations governing this competition.
8. Except in the case of the final, players drawn against each other must make their own arrangements for playing off their match on a court mutually agreed upon. In the event of disagreement, the first name drawn shall have the right to choose the ground.
9. In the general interests of competitors throughout the country it has been decided to divide into areas as far as possible all matches up to, and including, the Semi-Finals, the rule as stated under Clause 8, however, still standing.
10. The result of each first round match must be sent by the winners to the Editor of THE CHEMICAL AGE, signed by all four players (winners and losers) immediately after the match, and must reach the office of THE CHEMICAL AGE not later than 9.30 a.m. on June 1.
11. If any player be not present at the agreed place or time of the match, opponents shall be entitled to a walk-over, after having allowed reasonable time (say, a maximum of one hour) for the others' appearance. If the players find it impossible to play off their match on the day originally chosen, they must play it on any other day, to which both sides agree, within the stipulated period.
12. Any dispute arising between players, or otherwise, shall be referred to the arbitration of the Editor of THE CHEMICAL AGE, whose decision shall be final.
13. While competitors will make their own arrangements as to hard or grass courts for the preliminary rounds, it must be understood that the Finals will be played on hard courts.

First Round Draw

A. Whittle and **W. A. Thompson**
British Drug Houses, Ltd., Graham Street, City Road, N.1. (Phone: Clerkenwell 3000.)

v

C. Minkleston and **W. J. Wood**
B. Laporte, Ltd., Kingsway, Luton. (Phone: Luton 891.)

G. F. Hammond and **L. Giltrow**
Williams (Hounslow), Ltd. (Phone: Hounslow 2929.)

v

W. Backinsell and **R. A. Nottingham**
Le Grand, Sutcliff & Gell, Ltd., The Green, Southall, Middlesex. (Phone: Southall 2211.)

L. J. Loveday and **F. G. Neale**
Doulton & Co., Ltd., 28, High Street, Lambeth, S.E.1. (Phone: Reliance 1241.)

v

A. Collins and **H. Sibley**
British Oxygen Co., Ltd., Angel Road, Upper Edmonton, N.18. (Phone: Tottenham 2488.)

C. S. Carter and **S. A. Horstman**
B. Laporte, Ltd., Kingsway, Luton. (Phone: Luton 891.)

v

L. G. Williams and **H. H. Dalby**
Doulton & Co., Ltd., 28, High Street, Lambeth, S.E.1. (Phone: Reliance 1241.)

H. R. Rowlinson and **R. A. Whiteman**
British Drug Houses, Ltd., 16-32, Graham Street, City Road, N.1. (Phone: Clerkenwell 3000.)

v

W. Collard and E. Thomas
Dussek Bros. & Co., Ltd., Verney Road, Rotherhithe, S.E. (Bermondsey 2634.)

G. Harley and G. Hale
Dussek Bros. & Co., Ltd., Verney Road, Rotherhithe, S.E. (Bermondsey 2634.)

v

S. J. Sharman and **H. R. Whitaker**
Williams (Hounslow), Ltd. (Phone: Hounslow 2929.)

E. Thomsett and **R. Welsh**
British Oxygen Co., Ltd., Angel Road, Upper Edmonton, N.18. (Phone: Tottenham 2488.)

v

N. Hogg and **H. G. Short**
Riley, Harbord & Law, 130, Wilton Road, Victoria, S.W.1. (Phone: Victoria 2661.)

G. O. Smith and **E. Smith**
Riley, Harbord & Law, 130, Wilton Road, Victoria, S.W.1. (Phone: Victoria 2661.)

v

F. Bateman and **G. Smith**
Dussek Bros. & Co., Ltd., Verney Road, Rotherhithe, S.E. (Phone: Bermondsey 2634.)

D. G. Blow and **K. L. Fuller**
The British Drug Houses, Ltd., Graham Street, City Road, N.1. (Phone: Clerkenwell 3000.)

v

M. B. King and **R. H. Hornsby**
Howards & Sons, Ltd., Uphall Works, Ilford, Essex. (Phone: Ilford 1113.)

W. A. Robbins and **H. Nichols**
Le Grand Sutcliff & Gell, Ltd., The Green, Southall, Middlesex. (Phone: Southall 2211.)

v

W. J. Dauncey and **E. Browne**
G. A. Harvey & Co (London) Ltd., Woolwich Road, S.E.7. (Phone: Greenwich 0020.)

P. A. Tunstall and **John H. Fisher**
Salt Union, Ltd., 20, Water Street, Liverpool. (Phone: Liverpool Central 4370.)

v

S. E. Chaloner and **W. Speakman**
Monsanto Chemical Works, Ltd., Ruabon, N. Wales. (Phone: Ruabon 3.)

Idris Williams and **T. Clarke**
Monsanto Chemical Works, Ltd., Ruabon, N. Wales. (Phone: Ruabon 3.)

v

R. C. Pennington and **J. Pope**
Wm. Gossage & Sons, Ltd., Widnes, Lancs. (Phone: Widnes, 201.)

J. S. Boyd
(Scottish Dyes, Ltd.), Grangemouth. (Phone: Grangemouth 182.)
G. Rae
(I.C.I. Nobel's, Ltd., Westquarter Factory, Falkirk). (Phone: Polmont 15.)

v

W. G. Hiscock and
A. W. Clapham
I.C.I. Scottish Dyes, Ltd., Grangemouth. (Phone: Grangemouth 182.)

J. Ferguson-Davie and
L. Jones
Chance & Hunt, Ltd., Oldbury, Birmingham. (Phone: Broadwell 1521.)

v

A. J. Buck and
A. C. Hitchon
Bakelite, Ltd., Redfern Road, Tyseley, Birmingham. (Phone: Acocks Green 557).

Byes from First to Second Round

The following pairs have received byes from the first to the second round, and will be included in the second round draw, to be announced in THE CHEMICAL AGE on June 4.

W. B. Miller and
G. Lord
British Celanese, Ltd., Spondon, Nr. Derby. (Phone: Derby 2200.)

C. H. B. Jones and
Eric Cox
Anglo-Persian Oil Co., Ltd., Britannic House, Finsbury Circus, E.C.2. (Phone: National 1212.)

A. G. R. Clarke and
F. E. Peake
G. A. Harvey & Co. (London), Ltd., Woolwich Road, S.E.7. (Phone: Greenwich 0020, extension 311.)

E. G. Almond and
G. E. Mountney
Bakelite, Ltd., Redfern Road, Tyseley, Birmingham. (Phone: Acocks Green 557.)

A. Baxter (The United Yeast Co., 238, City Road, London. Phone: Clerkenwell 0303) and
V. J. Prosser (John Haig & Co., 2, Pall Mall East, London. Phone: Whitehall 1040).

A. A. Killick and
G. A. Brittain
B. Laporte, Ltd., Kingsway, Luton. (Phone: Luton 891.)

J. W. Urban and
F. S. Mortimer
Monsanto Chemical Works, Ltd., Victoria Station House, Victoria Street, S.W.1. (Phone: Victoria 1535.)

W. L. Alldis and
S. Perridge
Chemicals & Coke Ovens, Ltd., Vintry House, Queen Street Place, E.C.4. (Phone: Central 1411-2.)

F. C. White and
A. W. White
Howards & Sons, Ltd., Uphall Works, Ilford, Essex. (Phone: Ilford 1113.)

P. Smith and
B. T. Francis
Bakelite, Ltd., 68, Victoria Street, S.W.1. (Phone: Victoria 5441.)

C. G. Copp and
W. W. Marchant
Doulton & Co., Ltd., High Street, Lambeth, S.E.1. (Phone: Reliance 1241.)

L. Seabrook and
R. Frost
British Oxygen Co., Ltd., Angel Road, Upper Edmonton, N.18. (Phone: Tottenham 2488.)

J. E. Shirreff and
G. G. Stanford
Johnson, Matthey & Co., Ltd., 78, Hatton Garden, E.C.1. (Phone: Holborn 6989.)

D. Newton and
C. E. Davis
Allen & Hanburys, Ltd., Bethnal Green, E.2. (Phone: Bishopsgate 3201, ext. 82.)

F. G. Pretlove and
D. B. Hodgson
Geo. Scott & Son (London), Ltd., Bradfield Road, Silvertown, S.E.16. (Phone: Albert Dock 2020.)

L. F. Grape and
R. C. Mugridge
All communications: R. C. Vandermeulen, Borax Consolidated, Ltd., 16, Eastcheap, E.C.3. (Phone: Royal 1450.)

F. Hannon and
W. Ward
Dussek Bros. & Co., Ltd., Verney Road, Rotherhithe, S.E. (Phone: Bermondsey 2634.)

W. G. Baldock and
H. W. Drew
Williams (Hounslow), Ltd. (Phone: Hounslow 2929.)

The Institute of Chemistry

April Examination Results

FOLLOWING are the results of the April examinations of the Institute of Chemistry of Great Britain and Ireland:

Examination in general chemistry for the Associateship—Pass list: J. C. Blenkinsop, West Ham Municipal College, and Birkbeck College; A. Brooks, College of Technology, Manchester; M. T. Clark, Birkbeck College and Sir John Cass, Technical Institute; W. F. Crowther, College of Technology, Manchester; J. L. Denny, Polytechnic, Regent Street, London; W. H. Ferguson, University, and Royal Technical College, Glasgow; H. K. Hartley, University, Manchester; G. Ikin, College of Technology, Manchester; F. A. Jackman, Birbeck College, London; N. Marsh, Central Technical School, Liverpool; G. R. Marshall, Chelsea Polytechnic; D. Miller, Polytechnic, Regent Street, London; J. H. Weber, Birkbeck College; C. E. A. Wescott, Birkbeck College; G. White, Sir John Cass Technical Institute, London; and Wigan and District Mining and Technical College; and M. S. Wilson, Royal Technical College, Glasgow.

Examinations for the Fellowship; Pass list: In Branch C: Organic chemistry, with special reference to soaps and edible oils: A. E. Owen. In Branch E: The chemistry, including microscopy, of food and drugs, and of water: D. J. T. Bagnell, D. C. Garratt, H. Lee, J. U. Lewin, M. M. Love, S. R. Naidu, D. J. O'Sullivan and W. Wilson. In Branch F: Agricultural chemistry: G. H. Botham and M. F. Bywaters. In the chemical technology of textiles: W. Cowpe. In the chemistry of foods, with special reference to chocolate and confectionery: J. M. Tucker.

Italian Tartrate Exports

DURING the first nine months of 1931 Italy exported tartaric acid and tartaric materials as follows: Tartaric acid 1,801 metric tons; cream of tartar, 715 tons; argols, 7,256 tons and wine lees, 960 tons. The tartaric acid shipments went chiefly to Great Britain (383 tons), France (229), Argentina (146), Switzerland (126), Japan (118) and the United States (108). Most of the cream of tartar exports went to Great Britain (459 tons).

Iron Oxide for Gas Purification

A New Mining Industry for Cornwall

EMPLOYMENT will, it is hoped, be provided for a number of miners in Cornwall, where a small syndicate styling itself the British Iron Oxide, Ltd., has secured concessions and commenced the production of iron oxide for the purification of gas. The works are being managed by Mr. Percy Bond, who has had experience of ore mining in various parts of the world. In the course of an interview, Mr. Bond said that Cornish oxide has been known for years, but it has been used more or less in its rough state and not hitherto as a prepared oxide. After six months of tests they have come to the conclusion that Cornish oxide is superior to that from other sources. It has been found superior in active iron—a vital factor in gas purification—to any of the Belgian, Dutch or other ores, and even to a German synthetic compound which is being imported into this country and which is mixed with some inferior ores to create activity. The syndicate has been operating for three months in the Godolphin Valley at Leedstown, where rich oxide has been deposited.

In the Portreath and Nancekuke districts concessions have been taken over and operations have been commenced there. Negotiations are in progress for acquiring a section of the well-known Carnon Valley oxide deposits. The acquisition of a section of this area will result in the immediate employment of a number of local people

Non-Ferrous Metals in Architecture

THE use of metals in the rest room erected by I.C.I. Metals, Ltd., at the R.I.B.A. Exhibition which opened on May 2 at Thames House, Millbank, S.W.1, is intended to remind the profession of the rapid development which has taken place in the use of non-ferrous metals in architecture. In this room the metals are displayed from the standpoint of decorative effect, combined with permanence. Cupro-nickel faced plywood is used for the ceiling, while the walls are panelled in plywood faced with bronze. This is the first occasion on which a cupro-nickel alloy has been used for ceilings, although plywood faced with copper or brass is increasing in popularity for this application.

Weekly Prices of British Chemical Products

Review of Current Market Conditions

The following notes on the chemical market conditions in Great Britain are based on direct information supplied by the British manufacturers concerned, and unless otherwise qualified the figures quoted apply to fair quantities, net and naked at makers' works. Where no locality is indicated, the prices are general for the United Kingdom. Particulars of the London chemical market are specially supplied to THE CHEMICAL AGE by R. W. Greeff and Co., Ltd., and Chas. Page and Co., Ltd., and those of the Scottish chemical market by Chas. Tennant and Co., Ltd.

CONDITIONS in the London chemical market are generally unchanged, business being of a quiet and steady nature, with the undertone firm. There is no change in the market for coal tar products, prices remaining firm. Chemical prices on the Manchester market have kept remarkably steady during the past week and changes have been minor in character. Up to the present there are still no perceptible effects on values here of the changes in the tariff and with selling competition very keen any upward movement will probably be delayed until stocks have been reduced. In the meantime, buying interest has been only on moderate lines and new orders that are being placed locally have been for comparatively small quantities. In Scotland business remains steady, inquiries and orders received being, however, mostly for small quantities.

General Chemicals

ACETONE.—LONDON: £65 to £68 per ton; SCOTLAND: £66 to £68 ex wharf, according to quantity.

ACID, ACETIC.—Tech. 40%, £19 15s. per ton d/d address U.K. in casks. London: Tech. 80%, £37 5s to £39 5s.; pure 80%, £38 5s. to £40 5s.; tech., 40%, £19 15s. to £21 15s.; tech., 60%, £28 10s. to £30 10s. SCOTLAND: Glacial 98/100%, £48 to £50; pure 80%, £38 5s.; tech. 80%, £37 5s. d/d buyers' premises Great Britain. MANCHESTER: 80%, commercial, £39; tech. glacial, £52.

ACID, BORIC.—SCOTLAND: Granulated commercial, £26 10s. per ton; B.P. crystals, £35 10s.; B.P. powder, £36 10s. in 1-cwt. bags d/d free Great Britain in one-ton lots upwards.

ACID, CHROMIC.—11d. per lb., less 2½% d/d U.K.

ACID, CITRIC.—1s. 1d. per lb. LONDON: 1s. 1d., less 5%. MANCHESTER: 1s. 1½d.

ACID, CRESYLIC.—97/99%, 1s. 7d. to 1s. 9d. per gal.; 99/100%, 1s. 10d. to 2s.

ACID FORMIC.—LONDON: £50 per ton. *£52.

ACID, HYDROCHLORIC.—Spot, 3s. 9d. to 6s. carboy d/d according to purity, strength and locality. SCOTLAND: Arsenical quality, 4s.; dearsenicated, 5s. ex works, full wagon loads.

ACID, LACTIC.—LANCASHIRE: Dark tech.. 50% by vol., £23 10s. per ton; 50% by weight, £27 10s.; pale tech., 50% by vol., £27; 50% by weight, £32; 80% by weight, £52; edible, 50% by vol., £40. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £20 to £25 per ton makers' works, according to district and quality. SCOTLAND: 80°, £23 ex station full truck loads.

ACID, OXALIC.—LONDON: £47 per ton in casks, £48 10s. in kegs. SCOTLAND: 98/100%, £50 to £53 ex store. MANCHESTER: £2 10s. per cwt., ex store.

ACID, SULPHURIC.—Average prices f.o.r. British makers' works, with slight variations owing to local considerations: 140° Tw. crude acid, £3 per ton; 168° Tw. arsenical £5 10s.; 168° Tw. non-arsenical, £6 15s. SCOTLAND: 144° quality, £3 12s. 6d.; 168°, £7; dearsenicated, 20s. per ton extra.

ACID, TARTARIC.—1s. 1d. per lb. SCOTLAND: B.P. crystals, 1s. 1¾d. to 1s. 2d. less 5% carriage paid. MANCHESTER: 1s. 0¾d.

ALUM.—SCOTLAND: Lump potash, £9 per ton ex store.

ALUMINA SULPHATE.—LONDON: £8 5s. to £9 10s. per ton according to quality and quantity. SCOTLAND: £8 to £8 10s. ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb. d/d, according to quantity.

AMMONIUM CARBONATE.—SCOTLAND: Lump, £36 per ton; powdered, £38, packed in 5-cwt. casks d/d U.K. stations or f.o.b. U.K. ports.

AMMONIUM CHLORIDE.—£37 to £45 per ton, carriage paid. LONDON: Fine white crystals, £19 to £20. (See also Salammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton, carriage paid according to quantity. (See also Salammoniac.)

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

ANTIMONY OXIDE.—SCOTLAND: Spot £27 per ton, c.i.f. U.K. ports.

ANTIMONY SULPHIDE.—Golden 6½d. to 1s. 1½d. per lb.; crimson, 1s. 4d. to 1s. 6d. per lb. according to quality.

ARSENIC.—LONDON: £24 10s. c.i.f. main U.K. ports for imported material; Cornish nominal, £26 10s. f.o.r. mines. SCOTLAND: White powdered £27 ex wharf; spot, £27 10s. ex store. MANCHESTER: White powdered Cornish, £26 10s. at mines.

ARSENIC SULPHIDE.—Yellow 1s. 6d. to 1s. 8d. per lb.

BARIUM CHLORIDE.—£11 to £11 10s. per ton.

BISULPHIDE OF LIME.—£7 10s. per ton f.o.r. London, packages free.

BLEACHING POWDER.—Spot 35/37% £7 19s. per ton d/d station in casks, special terms for contract. SCOTLAND: £8 15s. in 5/6 cwt. casks.

BORAX, COMMERCIAL.—Granulated £15 10s. per ton, powder £17, packed in 1-cwt. bags, carriage paid any station Great Britain. Prices are for 1-ton lots and upwards.

CADMIUM SULPHIDE.—3s. 6d. to 3s. 9d. per lb.

CALCIUM CHLORIDE.—Solid 70/75% spot £5 5s. to £5 15s. per ton d/d station in drums. SCOTLAND: £5 5s. to £5 15s., according to quantity and point of delivery.

CARBON BISULPHIDE.—£30 to £32 per ton, drums extra.

CARBON BLACK.—4½d. to 5½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£45 to £55 per ton, drums extra.

CHROMIUM OXIDE.—10d. to 10½d. per lb. according to quantity d/d U.K. Green 1s. 2d. per lb.

CHROMETAN.—Crystals 3¾d. per lb. Liquor £19 10s. per ton d/d U.K.

COPPERAS GREEN.—SCOTLAND: £3 15s. per ton, f.o.r., or ex works.

CREAM OF TARTAR.—LONDON: £5 2s. 6d. to £5 3s. 6d. per cwt.

FORMALDEHYDE.—LONDON: £28 to £28 10s. per ton. *£30. SCOTLAND: 40%, £28 10s. ex store.

HYDROGEN PEROXIDE.—LONDON: *100 vols. 10d. per lb.

LAMPBLACK.—£46 to £50 per ton.

LEAD ACETATE.—LONDON: White, £40 to £42 per ton. Brown £1 per ton less. *£40 and £39 respectively ex wharf London. SCOTLAND: White Crystals £42 to £44 c.i.f. U.K. ports. Brown £1 per ton less. MANCHESTER: White, £37 to £38, Brown, £36.

LEAD, NITRATE.—LONDON: £28 10s. to £29 per ton; MANCHESTER: £28 10s.

LEAD, RED.—SCOTLAND: £28 10s. per ton d/d buyer's works.

LEAD, WHITE.—SCOTLAND: £40 per ton carriage paid.

LITHOPONE.—30%, £20 to £22 per ton.

MAGNESITE.—SCOTLAND: Ground Calcined £9 per ton ex store.

METHYLATED SPIRIT.—61 O.P. Industrial 1s. 8d. to 2s. 3d. gal. Pyridinised Industrial, 1s. 10d. to 2s. 5d. Mineralised, 2s. 9d. to 3s. 3d. 64 O.P. 1d. extra in all cases. Prices according to quantities. SCOTLAND: Industrial quality 64 O.P., 1s. 8d. to 2s. 3d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

NICKEL SULPHATE.—£38 per ton d/d.

PHENOL.—LONDON: *7d. per lb.

POTASH CAUSTIC.—£30 to £33 per ton. LONDON and MANCHESTER: £42.

POTASSIUM BICHROMATE.—Crystals and Granular, 5d. per lb. net d/d U.K. Discount according to quantity. Ground 5¼d. LONDON: 5d. per lb. with usual discounts for contracts. SCOTLAND: 5d. d/d U.K. or c.i.f. Irish Ports with allowance for contracts. MANCHESTER: 5d.

POTASSIUM CARBONATE.—SCOTLAND: 96/98% spot £28 per ton ex store. LONDON: £31 10s. to £32. MANCHESTER: £31 to £32.

POTASSIUM CHLORATE.—3¾d. per lb. export London in 1-cwt. kegs. LONDON: £37 to £40 per ton. SCOTLAND: 99¾/100% powder, £34. MANCHESTER: £36.

POTASSIUM CHROMATE.—6½d. per lb. d/d U.K.

POTASSIUM NITRATE.—SCOTLAND: Refined Granulated £28 per ton c.i.f U.K. ports. Spot £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 8½d. to 9d. per lb. SCOTLAND: B.P. crystals, 8½d. MANCHESTER: Commercial, 8d.; B.P., 8½d.

POTASSIUM PRUSSIATE.—LONDON: 8½d. to 9d. per lb. SCOTLAND: Yellow spot material, 8½d. ex store. MANCHESTER: Yellow, 8½d.

SALAMMONIAC.—First lump spot, £42 17s. 6d. per ton d/d address in barrels.

SODA ASH.—58% spot, £6 per ton f.o.r. in bags, special terms for contracts.

SODA, CAUSTIC.—Solid 76/77° spot £14 10s. per ton d/d station. SCOTLAND: Powdered 98/99% £17 10s. in drums, £18 15s. in casks. Solid 76/77% £14 10s. in drums. 70/72% £14 12s. 6d. carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less. MANCHESTER: £12 15s. to £14 contracts.

* Prices quoted by other manufacturers.

SODA CRYSTALS.—Spot £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.
SODIUM ACETATE.—£21 to £22 per ton.
SODIUM BICARBONATE.—Refined spot £10 10s. per ton d/d station in bags. SCOTLAND: Refined recrystallised £10 10s. ex quay or station. MANCHESTER: £10 10s.
SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount according to quantity. Anhydrous 5d. per lb. LONDON: 4d. per lb. with discounts for quantities. SCOTLAND: 4d. delivered buyer's premises with concession for contracts. MANCHESTER: 4d. less 1 to 3½% contracts, 4d. spot lots.
SODIUM BISULPHITE POWDER.—60/62%, £16 10s. per ton d/d 1-cwt. iron drums for home trade.
SODIUM CARBONATE (SODA CRYSTALS).—SCOTLAND: £5 to £5 5s. per ton ex quay or station. Powdered or pea quality 7s. 6d. per ton extra. Light Soda Ash £7 ex quay, min. 4-ton lots with reductions for contracts.
SODIUM CHLORATE.—2⅝d. per lb. LONDON: £30 per ton. *£32 10s. MANCHESTER: £29.
SODIUM CHROMATE.—3⅝d. per lb. d/d U.K.
SODIUM HYPOSULPHITE.—SCOTLAND: Large crystals English manufacture £9 5s. per ton ex stations, min. 4-ton lots. Pea crystals £15 ex station 4-ton lots. MANCHESTER: Commercial, £9 5s.; photographic, £15.
SODIUM NITRITE.—Spot £19 to £22 per ton d/d station in drums.
SODIUM PERBORATE.—LONDON: 10d. per lb.
SODIUM PHOSPHATE.—£13 to £15 per ton f.o.r. London casks free. LONDON: Dibasic, £13 per ton. MANCHESTER: £13 10s.
SODIUM PRUSSIATE.—LONDON: 5d. to 5½d. per lb. SCOTLAND: 5d. to 5¾d. ex store. MANCHESTER: 5d. to 6d.
SODIUM SILICATE.—140° Tw. Spot £8 5s. per ton d/d station returnable drums.
SODIUM SULPHATE (GLAUBER SALTS).—£4 2s. 6d. per ton d/d. SCOTLAND: English material £3 15s.
SODIUM SULPHATE (SALT CAKE).—Unground Spot £3 15s. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 2s. 6d.
SODIUM SULPHIDE.—Solid 60/62% Spot £10 15s. per ton d/d in drums. Crystals Spot £7 15s. per ton d/d in casks. SCOTLAND: For home consumption, Solid 60/62%, £10 5s.; broken 60/62%, £11 5s.; crystals, 30/32%, £8 2s. 6d. d/d buyer's works on contract, min. 4-ton lots. Spot solid 5s. per ton extra. Crystals, 2s. 6d. per ton extra. MANCHESTER: Concentrated solid, 60/62%, £11 10s.; commercial, £8.
SODIUM SULPHITE.—Pea crystals spot, £13 10s. per ton d/d station in kegs. Commercial spot £9 10s. d/d station in bags.
SULPHATE OF COPPER.—MANCHESTER: £18 per ton f.o.b.
SULPHUR.—£12 5s. to £15 15s. per ton. SCOTLAND: Flowers, £12 10s.; roll, £12 10s.; rock, £9. Ground American, £12 ex store.
SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quality.
SULPHUR PRECIP.—B.P. £55 to £60 per ton according to quantity. Commercial, £50 to £55.
VERMILION.—Pale or deep, 6s. 4d. per lb.
ZINC CHLORIDE.—SCOTLAND: British material, 98%, £18 10s. per ton f.o.b. U.K. ports.
ZINC SULPHATE.—LONDON and SCOTLAND: £12 per ton.
ZINC SULPHIDE.—1s. to 1s. 2d. per lb.

Coal Tar Products

ACID, CARBOLIC (CRYSTALS).—5½d. to 6¾d. per lb. Crude, 60's 1s. 5½d. to 1s. 6¼d. per gal. SCOTLAND: Sixties, 1s. 7d. to 1s. 8d.
ACID, CRESYLIC.—99/100, 1s. 7d. per gal.; B.P., 2s. to 2s. 2d.; Refined, 1s. 0d. to 1s. 11d.; Pale, 98%, 1s. 6d. to 1s. 7d.; Dark, 1s. 4d. to 1s. 4½d. LONDON: 98/100%, 1s. 6d. Dark 95/97%, 1s. 4d. SCOTLAND: Pale 99/100%, 1s. 3½d. to 1s. 4½d.; 97/99%, 1s. 1½d. to 1s. 2½d.; dark 97/99%, 1s. 0½d. to 1s. 1½d.; high boiling acid, 2s. 6d. to 3s.
BENZOL.—At works, crude 7d. to 7½d. per gal. Standard motor, 1s. 2d. to 1s. 3d.; 90%, 1s. 3d. to 1s. 4d. Pure, 1s. 6d. to 1s. 7d. LONDON: Motor, 1s. 5½d. SCOTLAND: Motor, 1s. 3½d. to 1s. 4½d.; 90%, 1s. 9½d. to 1s. 10½d.
CREOSOTE.—Standard for export, 4¾d. to 5d. nett per gal. f.o.b. for Home, 3¾d. d/d. LONDON: 3d. to 3½d. f.o.r. North; 4d. to 4½d. London. MANCHESTER: 4d. to 5d. SCOTLAND: Specification oils, 3¾d. to 4¼d.; washed oil, 4d. to 4½d.; light, 4d. to 4½d.; heavy, 4¼d. to 5d.
NAPHTHA.—Solvent, 90/160, 1s. 4d. to 1s. 5d. per gal.; 95/160, 1s. 4½d.; 90/190, 11d. to 1s. 1d. LONDON: Solvent, 1s. 1½d. to 1s. 2d.; heavy, 11d. to 1s. 0½d. f.o.r. SCOTLAND: 90/160, 1s. 3d. to 1s. 3½d.; 90/190, 1s. 1d. to 1s. 2d.
NAPHTHALENE.—Purified crystals, £9 10s. per ton in bags. LONDON: Fire lighter quality, £3 to £3 10s.; 74/76 quality, £4 to £4 10s.; 76/78 quality, £5 10s. to £6. SCOTLAND: 40s. to 50s.; whizzed, 65s. to 70s.
PYRIDINE.—90/140, 3s. 9d. per gal.; 90/160, 4s. to 4s. 6d.; 90/180, 2s. to 2s. 6d. SCOTLAND: 90/160%, 4s. to 5s.; 90/220%, 3s. to 4s.
REFINED COAL TAR.—SCOTLAND: 5d. to 5½d. per gal.
TOLUOL.—90%, 2s. 2d. per gal.; Pure, 2s. 7d.
XYLOL.—1s. 9d. per gal.; Pure, 1s. 11d.

Intermediates and Dyes

IN the following list of Intermediates delivered prices include packages except where otherwise stated:—
ACID, BENZOIC, B.P. (ex Toluol).—1s. 9½d. per lb.
ACID, GAMMA.—Spot, 4s. per lb. 100% d/d buyer's works.
ACID H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.
ACID, NEVILLE AND WINTHER.—Spot, 3s. per lb. 100% d/d buyer's works.
ACID, SULPHANILIC.—Spot, 8¼d. per lb. 100% d/d buyer's works.
ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works.
ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.
BENZALDEHYDE.—Spot, 1s. 8d. per lb., packages extra.
BENZIDINE BASE.—Spot, 2s. 5d. per lb. 100% d/d buyer's works.
o-CRESOL 30/31° C.—£2 6s. 5d. per cwt., in 1-ton lots.
m-CRESOL 98/100%.—2s. 9d. per lb., in ton lots.
p-CRESOL.—34.5° C.—1s. 9d. per lb., in ton lots.
DICHLORANILINE.—2s. 2d. per lb.
DIMETHYLANILINE.—Spot, 1s. 6d. per lb., package extra.
DINITROBENZENE.—8¼d. per lb.
DINITROTOLUENE.—48/50° C., 8¼d. per lb.; 66/68° C., 9d. per lb.
DIPHENYLAMINE.—Spot, 2s. per lb., d/d buyer's works.
a-NAPHTHOL.—Spot, 2s. 4d. per lb., d/d buyer's works.
B-NAPHTHOL.—Spot, £75 per ton in 1-ton lots, d/d buyer's works.
a-NAPHTHYLAMINE.—Spot, 11½d. per lb., d/d buyer's works.
B-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.
o-NITRANILINE.—5s. 10d. per lb.
m-NITRANILINE.—Spot, 2s. 6d. per lb. d/d buyer's works.
p-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.
NITROBENZENE.—Spot, 6½d. per lb.; 5-cwt. lots, drums extra.
NITRONAPHTHALENE.—9d. per lb.
SODIUM NAPHTHIONATE.—Spot, 1s. 9d. per lb.
o-TOLUIDINE.—Spot, 9½d. per lb., drums extra, d/d buyer's works.
p-TOLUIDINE.—Spot, 1s. 9d. per lb., d/d buyer's works.
m-XYLIDINE ACETATE.—3s. 6d. per lb., 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £7 10s. per ton. Grey, £12. Liquor, 8d. to 9d. per gal. MANCHESTER: Brown, £7 5s.; grey, £11.
ACETIC ACID, TECHNICAL, 40%.—£16 15s. to £17 15s. per ton.
ACETONE.—£63 to £65 per ton.
AMYL ACETATE, TECHNICAL.—95s. to 100s. per cwt.
IRON LIQUOR.—24°/30° Tw., 10d. to 1s. 2d. per gal.
WOOD CREOSOTE.—1s. to 2s. 6d. per gal., unrefined.
WOOD NAPHTHA, MISCIBLE.—3s. to 4s. per gal. Solvent, 3s. 9d. to 4s. 9d. per gal.
WOOD TAR.—£2 10s. to £6 per ton.
BROWN SUGAR OF LEAD.—£32 per ton.

Latest Oil Prices

LONDON, May 4.—LINSEED OIL was inactive. Spot (small quantities), £16; May, £12 17s. 6d.; May-Aug., £13; Sept.-Dec. £14 5s.; Jan.-April, £15 5s. per ton naked. RAPE OIL was slow. Crude extracted, £28 10s.; technical refined, £30 10s. per ton, naked, ex wharf. COTTON OIL was quiet. Egyptian crude, £19 10s. refined common edible, £23; and deodorised, £25 per ton, naked, ex mill. TURPENTINE was quiet. American, spot, 57s. 9d.; June, 55s. 3d. per cwt.

HULL.—LINSEED OIL, spot, closed at £12 15s. per ton; May at £12 7s. 6d.; May-Aug. at £12 10s.; Sept.-Dec. at £13 10s.; Jan.-April at £14 10s. COTTON OIL, Egyptian, crude, spot, £19 5s.; edible, refined, spot, £21 10s.; technical, spot, £21 10s.; deodorised, £23, naked. PALM KERNEL OIL, crude, f.m.q., spot, £22, naked. GROUNDNUT OIL, crushed/extracted, spot, £32 10s.; deodorised, £36 10s. RAPE OIL, crushed/extracted, spot, £28; refined, £29 10s. SOYA OIL, crushed/extracted, spot, £19 5s.; deodorised, £22 5s. per ton. COD OIL, 17s. per cwt. TURPENTINE, American, spot, 55s. per cwt. CASTOR OIL, pharmacy, spot, 43s. 6d.; first, 38s. 6d.; second, 33s. 6d. per cwt.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—*Export.*—The market has weakened further, and the price for neutral quality is now £4 15s. per ton f.o.b. U.K. port in single bags. Supplies appear to be plentiful and it remains to be seen if the market will hold firm at this figure. *Home.*—A large number of manufacturers are offering at well below the scheduled price of £7 per ton delivered in 6-ton lots to consumers' nearest station. It is reported that purchases can now be made freely at £6 5s. per ton. The volume of buying has diminished considerably especially in the South.

NITRATE OF SODA.—Imported material continues to be offered at £9 per ton delivered in 6-ton lots to consumers' nearest station. The price of British material has been reduced to £8 16s. per ton delivered in 6-ton lots to consumers' nearest station.

NITRO-CHALK.—The price remains at £7 5s. per ton delivered in 6-ton lots to consumers' nearest station, and the demand continues to be brisk.

* Prices quoted by other manufacturers.

From Week to Week

NEGOTIATIONS HAVE BEEN COMPLETED by the British Road Tar Association for the public exhibition of the Association's short version talking film, "Tar," at a minimum of 300 cinema halls throughout the country. The first list of three-day bookings, from May 9 to June 13, comprises thirty-four halls.

A FURTHER GRANT OF PROBATE, in respect of settled land valued at £68,701, has been issued in respect of the estate of the late Sir Woolmer White, of Salle Park, Norfolk, and Southleigh Park, Hants, chemist and druggist. Sir Woolmer White left unsettled property already valued at £859,945, making a total value of property passing at his death of £928,640.

MR. PHILIP MARSDEN, of Moor Allerton, Leeds, dyer and finisher, who died on March 13, aged 79, left estate of the gross value of £27,072, with net personalty £18,133. He left £500 to Leeds General Infirmary for the endowment of a cot to be known as the "Eliza Marsden Cot," £250 to the Women's and Children's Hospital, Leeds, and £250 to the Leeds Unmarried Women's Benevolent Institution.

DRASTIC PROPOSALS for a two months' shut-down on the part of the countries participating in the tin restriction scheme have been proposed and adopted at a meeting of the London Council of the Tin Producers' Association. The proposals include the complete cessation of operations for two months. Production would be resumed at the rate of 40 per cent. of standard until the price of the metal had averaged £200 per ton for one month, when the quota would be raised to 50 per cent. The International Pool would not be permitted to release its holdings below £200 per ton.

ONE MAN WAS FATALLY INJURED, three others received serious injuries, and one slight injuries in an explosion at Darlington Forge on May 2 while compressed oxygen was being transferred from large containers to smaller ones. The accident occurred in the steel dressing shop. Part of the roof and the end of the building were blown out and bricks, steel, and dust flew in all directions. About two dozen men were in the shop at the time. The explosion was described as being like a roll of thunder, and its force shook houses in the district and broke a window 200 yards away. Speaking at the annual meeting of the British Oxygen Co., Ltd., in London on May 3, Mr. K. S. Murray, chairman of directors, said some of the newspapers had identified that company with the accident, but he wished to inform the shareholders that the British Oxygen Co. had no connection whatsoever with the affair.

MR. F. D'ARCY COOPER, presiding at the annual meeting of Unilever, Ltd., on April 29, said that the group's reserves amounted to over 50 per cent. of the ordinary capital, while the total assets represented a value at least equal to their book figure; the liquid position and the cash resources were better than they had ever been, while raw materials were on a sound basis. Earlier he stated that current assets of the organisation again exceeded current liabilities by over £30,000,000. He referred to the antagonism that existed in the mind of the public to large business organisations, based on the fear that they were too unwieldy for proper management. "Should not the public be careful in condemning all large business organisations because of the mismanagement or the failure of a few?" he asked. "We are satisfied," he added, "that from a commercial, as well as a financial and administrative point of view, an organisation has been constituted which is simple and effective. With proper organisation, I believe that it is no more difficult to manage a large number of businesses than a few." It was stated that the actual net profits for the first quarter of 1932 exceeded those for the corresponding period of last year.

A VERDICT THAT SHE HAD DIED from bronchial pneumonia set up by silicosis brought about by her employment, was returned at an inquest, at Birkenhead on May 2, on Margaret Ann Waring (26), of Pitt Street, Rock Ferry. She had been employed at Lever Brothers' soap works at Port Sunlight from 1919 to 1929, when she was taken ill. She was attended by Dr. Moulden, of Rock Ferry, and was subsequently removed to Tranmere Infirmary, where she died. Mr. C. K. Atkinson, safety first manager at the Port Sunlight works, said silicosis had become a matter of concern to the firm. There was no silica in dry soap, bu there was in Vim, and the woman worked in the Vim packing department for three years. All employees were examined before working in the department and then at quarterly intervals. Respirators had been supplied in the department since they started making Vim about twenty-six or twenty-seven years ago. The company had spent thousands of pounds on improvement schemes, complying with any suggestions of the factory inspectors. Mr. E. F. Smith, factory inspector, said that although that particular disease was not reportable, they were much concerned about the removal of dust from works. There had been tremendous improvements carried out at the Port Sunlight works, and many thousands of pounds had been spent on ventilation. The serious aspect of the disease was comparatively recent. Any suggestions made had been carried out by the company.

AT A CONGREGATION of the Senate of Cambridge University on April 30, the honorary degree of Doctor of Science was conferred upon Sir William H. Bragg, director of the Royal Institution of Great Britain.

LARGE QUANTITIES OF SEAWEED have been thrown up on the west and north-west coast of Ireland by the recent heavy storms along the Atlantic seaboard. The production of kelp from the weed has been considerably above the normal and consequently the output of iodine from the Galway factory of the Free State Government will be somewhat increased during the coming months.

SIR GEORGE PATON, chairman and managing director of Bryant and May, Ltd., informed the shareholders, at the annual meeting on April 28 that the company had purchased the assets of British Booklet Matches (1928), which would shortly go into liquidation, after a somewhat chequered career. From first to last, something like £250,000 had been lost by its shareholders.

THE IMPORT DUTIES ADVISORY COMMITTEE is considering applications made under Section 1 (3) of the Import Duties Act, 1932, for the addition of the following goods to the free list: Citrate of lime, emery stone or ore in the unground condition, mercury, argol and other crude tartrates, gallnuts and kelp. Any representations concerning these applications should be addressed in writing to the Secretary, Import Duties Advisory Committee, Caxton House (West Block), Tothill Street, London, S.W.1, not later than May 14.

THE FIRST DELEGATES to an international petroleum conference, those from Soviet Russia, arrived in New York on May 3. Other delegates to the conference are M. Heinrich von Riedemann, of Zurich, a director of the Standard Oil Co. of New Jersey, Mr. W. Fraser, deputy-chairman of the Anglo-Persian Oil Co., Ltd., and subsidiary companies, Mr. R. L. Watson, managing director of the Burmah Oil Co., Ltd., and director of the Anglo-Persian Oil Co., and the Shell Transport and Trading Co., and Mr. J. B. Aug. Kessler, joint managing director of the Royal Dutch Group. The conference will open next week and will discuss the balancing of production with demand and also the division of the foreign petroleum markets. Hitherto, the main difficulty in reaching any agreement has been the refusal of Russia to participate in any discussion.

SPEAKING AT THE MONTHLY LUNCHEON of the Oil Industries Club on May 2, Dr. Eugene Shaw, chief geologist of the Iraq Petroleum Co., Ltd., said that the geologists were partly responsible for the present state of the oil industry, and they should now try to find ways to ameliorate the damage they have done. The only thing for the oil industry to do would seem to be to reduce costs, and one of the obvious methods was to organise the spacing of wells in an oil pool in such a manner that the maximum recovery could be obtained with a minimum number of wells, thus reducing the costs of drilling. He had for years dreamed of the possibility of recovering greater volumes of oil from wells by the use of superheated steam or air, and from the point of view of drilling costs, he thought that was worth consideration. He saw no reason for expecting any sudden recovery from the ills of the industry in the near future, nor for a sudden early shortage of oil, and yet, on the other hand, there was the possibility of a shortage which would increase in intensity through two or three decades. It was important that they should investigate all possible methods of cost reduction.

Obituary

MR. HERBERT EDWARD BRADSHAW, petroleum technologist, on May 1, in a nursing home. The funeral was at Golders Green Crematorium on Thursday, May 5.

MR. FRANCIS E. SUMPTER, for 26 years in the service of Goodlass, Wall and Co., Ltd., pain manufacturers, of Liverpool, suddenly at 14 Drakefield Road, Liverpool, late of Everton.

Forthcoming Events

May 9.—Royal Institution. General Meeting. 5 p.m. 21, Albemarle Street, London.

May 11.—Institute of Metals. Twenty-second Annual May Lecture. "The Plastic Deformation of Metals." Professor Dr. F. Korber. 8 p.m. The Institution of Mechanical Engineers, Storey's Gate, London.

May 11.—Television Society. "Seven Years' Experimental Research and Investigation in Television." Robert W. Corkling. 7 p.m. University College, London.

May 11.—Business Research and Management Association. "Education for Management." Professor P. Sargant Florence. 7 p.m. Anderton's Hotel, Fleet Street, London.

May 13.—British Association of Chemists (London Section). Annual General Meeting, 7 p.m. Smoking Concert, 8.15 p.m. Broad Street Station Restaurant, London.

Inventions in the Chemical Industry

Specifications Accepted and Applications for Patents

THE following information is prepared from the Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given in "Specifications Accepted" are those under which the specifications are printed. Abridgments of "Complete Specifications open to Public Inspection" will not be published until they have been accepted or the applications have become void. The dates given are those claimed under the International Convention. The numbers in "Applications for Patents" are for reference in all correspondence up to the acceptance of the complete specifications. In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.

Specifications Accepted with Date of Application

PROCESS FOR PREPARING CARBON DIOXIDE AND SILICEOUS MATERIALS. Process Development Co. May 6, 1930. 370,889.

PRODUCTION OF SOLUBLE RESINOUS PRODUCTS. I. Rosenblum. Oct. 7, 1930. 370,916.

MANUFACTURE AND PRODUCTION OF METAL CARBONYLS. J. Y. Johnson (*I. G. Farbenindustrie*). Oct. 8, 1930. 370,962.

PRODUCTION OF MIXED FERTILISERS COMPOSED OF AMMONIUM NITRATE AND AMMONIUM SULPHATE. Ruhrchemie A.G. Oct. 10, 1929. 370,993.

PRODUCTION OF BENZINES, BENZENES, AND OTHER HYDROCARBONS FROM COAL TARS AND OILS. R. E. Goldsbrough. Oct. 21, 1930. 371,042.

PROCESS FOR THE MANUFACTURE OF FATTY ACIDS FROM LOW-QUALITY FATTY OILS AND FATS. J. Y. Johnson (*I. G. Farbenindustrie*). Nov. 30, 1930. 370,964.

MANUFACTURE OF CELLULOSE OF CELLULOSIC COMPOUNDS. H. Dreyfus. Nov. 8, 1930. 371,000.

PROCESS FOR ELIMINATING CHLORINE FROM SOLUTIONS CONTAINING ZINC CHLORIDE, AND SOLUTIONS OBTAINED THEREBY. Nichols Copper Co. Nov. 25, 1929. 370,965.

MANUFACTURE OF CELLULOSE OR CELLULOSIC COMPOUNDS. H. Dreyfus. Nov. 11, 1930. 371,001.

MANUFACTURE AND PRODUCTION OF THE CARBONYLS OF MOLYBDENUM AND TUNGSTEN. J. Y. Johnson (*I. G. Farbenindustrie*). Dec. 3, 1930. 370,984.

PROCESS AND INSTALLATION FOR THE TREATMENT OF PEAT AND OTHER FOSSIL-FUELS. O. Linker and Z. Schoenborn. Jan. 7, 1931. 370,929.

INTERMEDIATES AND DYESTUFFS. E. I. Du Pont de Nemours & Co. Feb. 11, 1930. 370,905.

REMOVAL OF CARBON OXYSULPHIDE FROM GASES. S.I.R.I. Soc. Italiana Ricerche Industriali. Jan. 21, 1930. 370,978.

DESTRUCTIVE HYDROGENATION OF HIGH BOILING-POINT HYDROCARBONS WITH THE FORMATION THEREFROM OF HYDROCARBONS HAVING A LOWER BOILING-POINT. Gas Light and Coke Co., and R. H. Griffith. Jan. 12, 1931. 370,909.

TREATMENT OF GASES AND VAPOURS CONTAINING SULPHUR COMPOUNDS. Trinidad Leaseholds, Ltd. (F. L. Melvill). Jan. 12, 1931. 370,911

MANUFACTURE OF PREPARATIONS CONTAINING HIGHER FATTY-ACID DERIVATIVES. A. G. Bloxam (*Soc. of Chemical Industry in Basle*). Jan. 13, 1931. 371,023.

TREATMENT OF DIVIDED NON-GASEOUS MATERIAL IN SUSPENSION IN A GASEOUS MEDIUM. W. W. Triggs (*Western Precipitation Co.*). Jan. 13, 1931. 370,942.

MANUFACTURE OF ARTIFICIAL SILK. S. Dunlop (*Chatillon Soc. Anon. Italiana par la Seta Artificiale*). Jan. 13, 1931. 370,943.

SIZING-AGENTS. Aceta Ges. Jan. 21, 1930. 371,048.

PRODUCTION OF BUTYRALDEHYDE. G. F. Horsley and Imperial Chemical Industries, Ltd., Jan. 21, 1931. 371,051-2.

PROCESS FOR THE MANUFACTURE OF DICHROMATES. Bozel-Maletra Soc. Industrielle de Produits Chimiques. Aug. 14, 1930. 371,050.

TANNING MATERIALS AND LEATHER MANUFACTURED THEREWITH. H. G. Bennett. Feb. 2, 1931. 371,070.

MANUFACTURE OF DERIVATIVES OF OXY-FATTY-ACIDS. Soc. of Chemical Industry in Basle. Mar. 25, 1930. 371,088.

NICKEL-MOLYBDENUM ALLOYS. Vereinigte Stahlwerke Akt.-Ges. July 4, 1930. 371,102.

PREPARATION OF ALUMINA. Lonza-Werke Elektrochemische Fabriken Ges. Mar. 7, 1930. 371,112.

PROCESS FOR ACTIVATING GAS PURIFICATION MASSES. Gewerkschaft M. Stinnes. May 5, 1930. 371,117.

METHODS AND APPARATUS FOR REMOVING DUST OR OTHER IMPURITIES FROM GASES BY WASHING. Davidson & Co., Ltd., and J. C. Trill. Mar. 18, 1931. 371,129.

PURIFICATION OF ACETYLENE. J. Y. Johnson (*I. G. Farbenindustrie*). Mar. 27, 1931. 371,142.

MANUFACTURE OF ESTERS OF SULPHONATED AROMATIC CARBOXYLIC ACIDS. Soc. of Chemical Industry in Basle. Mar. 29, 1930. 371,144.

PREPARATION OF 2-MERCAPTOBENZOTHIAZOLE. Silesia Verein Chemischer Fabriken. June 11, 1930. 371,172.

SOLIDIFICATION OF SODIUM HYPOCHLORITE SOLUTION (BLEACHING LIQUID). Soc. Anon. Chlorosoda. May 26, 1930. 371,176.

MANUFACTURE OF VAT DYESTUFFS. I. G. Farbenindustrie. May 19, 1930. 371,185.

PRODUCTION OF CORROSION-RESISTING COATINGS ON ALUMINIUM OR ALUMINIUM ALLOYS. Siemens-Elektro-Osmose Ges. July 1, 1930. 371,213.

MANUFACTURE OF ALUMINA AND COMPOUNDS THEREOF. Alterra Akt.-Ges. July 26, 1930. 371,236.

PREPARATION OF A GLASSY-DRYING SUBSTANCE FROM CEMENT WITH OR WITHOUT COLOURS. J. F. Barr. Nov. 15, 1930. 371,257.

PRODUCTION OF LUBRICATING OILS AND LIGHTER HYDROCARBONS BY THE HYDROGENATION OF HYDROCARBONS. W. L. Gomory. Sept. 19, 1930. 371,273.

PRODUCTION OF ANHYDROUS NEUTRAL CALCIUM NITRATE. Kali-Forschungs-Anstalt Ges. Feb. 24, 1931. 371,279.

PROCESS FOR THE PRODUCTION OF SOLUBLE RESINOUS PRODUCTS. I. Rosenblum. Oct. 7, 1930. 370,946.

PROCESS FOR SEPARATING ALUMINIUM HYDROXIDE FROM SILICIC ACID. Alterra Akt.-Ges. July 26, 1930. 371,307.

MANUFACTURE OF CELLULOSE OF CELLULOSIC COMPOUNDS. H. Dreyfus. Nov. 8, 1930. 371,037-8.

TREATMENT OF FIBROUS MATERIALS. J. Y. Johnson (*I. G. Farbenindustrie*). Nov. 14, 1930. 371,041.

PROCESS FOR MANUFACTURING FORMALDEHYDE FROM GAS CONTAINING HYDROGEN AND CARBON MONOXIDE. L. H. Roman. July 19, 1930. 371,377.

PRODUCTION OF VAT DYESTUFFS. L. J. Hooley, R. F. Thomson, D. A. W. Fairweather, and Scottish Dyes, Ltd. Oct. 18, 1930. 371,420.

MANUFACTURE AND PRODUCTION OF POLYMERISATION PRODUCTS. J. Y. Johnson (*I. G. Farbenindustrie.*) Nov. 14, 1930. 371,396.

MANUFACTURE AND PRODUCTION OF STYRENE AND ITS HOMOLOGUES. J. Y. Johnson (*I. G. Farbenindustrie*). Nov. 14, 1930. (Addition to 29578/29.) 371,335.

CATALYTIC REDUCTION OF INDIGO. Imperial Chemical Industries, Ltd., K. H. Saunders, and W. V. Stubbings. Jan. 20, 1931. 371,374.

MANUFACTURE AND PRODUCTION OF FERTILISERS. Imperial Chemical Industries, Ltd. Jan. 21, 1930. 371,437.

MANUFACTURE OF CHROMIFEROUS AZO-DYESTUFFS. Soc. of Chemical Industry in Basle. Jan. 23, 1930. 371,449.

PROCESS FOR THE MANUFACTURE OF THIOINDIGOID DYESTUFFS. A. Carpmael (*I. G. Farbenindustrie*). Jan. 24, 1931. 371,459.

AGE-RESISTING RUBBER COMPOUNDS. Imperial Chemical Industries, Ltd., H. M. Bunbury, J. S. H. Davies, and W. J. S. Naunton. Jan. 28, 1931. 371,474.

MANUFACTURE OF ALKAMINES. I. G. Farbenindustrie. Jan. 31, 1930. 371,490.

REFINING ANIMAL OR VEGETABLE OILS. J. Y. Johnson (*I.G. Farbenindustrie*). Feb. 6, 1931. 371,503.

PROCESS OF CONCENTRATING DILUTE ALIPHATIC ACIDS. W. W. Groves (*Badger & Sons Co., E.B.*). March 18, 1931. 371,554.

PROCESS FOR THE MANUFACTURE OF ACETAMIDE AND ACETIC ACID. Soc. Française de Catalyse Generalisée. March 26, 1930. 371,555.

PROCESS FOR THE MANUFACTURE OF ESTER ACETATES DIRECT FROM CALCIUM ACETATE. E. G. Corbett. April 13, 1931. 371,586.

PRODUCTION OF LEUCO-1-4-5-8-TETRAAMINOANTHRAQUINONE AND DERIVATIVES THEREOF. Verein fur Chemische und Metallurgische produktion. April 17, 1930. 371,594.

PRODUCTION OF SODIUM CARBONATE AND AMMONIUM CHLORIDE. A. Mentzel. May 20, 1930. 371,621.

PROCESS FOR TESTING ALUMINIUM PHOSPHATES. Chemische Werke Vorm. H. and E. Albert. May 14, 1930. 371,632.

MANUFACTURE OF AMMONIA. A. Mentzel. Aug. 15, 1930. 371,709.

Complete Specifications open to Public Inspection

PROCESS FOR THE PRODUCTION OF SYNTHETIC RESINS FROM ALCOHOLAMINES AND ORGANIC ACIDS. Chemische Fabriken Dr. K. Albert Ges. April 17, 1931. 18161/31.

PROCESS FOR THE PRODUCTION OF ALUMINIUM DERIVATIVES OF ACETYLSALICYLIC ACID. Chinoin Fabrik Chemisch-Pharmaceutischer Produkte Akt.-Ges., and Dr. E. Wolf. Apr. 15, 1931. 1786/32.

PROCESS OF PRODUCING CHROMIUM. Heraeus-Vacuumschmelze Akt.-Ges., and Dr. W. Rohn. Apr. 15, 1931. 4120/32.

SEPARATION OF UNSAPONIFIABLE MATTER FROM FATTY-ACID MATERIALS. I. G. Farbenindustrie. Apr. 18, 1931. 4432/32.

MANUFACTURE OF CELLULOSE ACETATE. Kodak, Ltd. Apr. 13, 1931. 10130/32.

INDUSTRIAL SOLVENTS

MANUFACTURED BY

BRITISH INDUSTRIAL SOLVENTS, *LIMITED,*

KINNAIRD HOUSE, PALL MALL EAST, LONDON, S.W.1.

Telegrams: Aldersolv, 'Phone, London.

Telephone: Whitehall 1040

Acetic Acid
Acetone
Acetaldehyde
Amyl Alcohol
Butyl Alcohol
Isobutyl Alcohol
Butyl Aldehyde
Acetates
Formates
Lactates
Oleates
Oxalates
Phthalates
Propionates
Salicylates
Stearates
Tartrates

SELLING AGENTS

BARTER TRADING CORPORATION LIMITED,

14, WATERLOO PLACE, LONDON, S.W.1.

Telephone: Whitehall 1301.

PROCESS FOR REFINING SUGAR, OR SUBSTANCES CONTAINING SAME, SUCH AS BEET PULP, BEET SLICES, CRUSHED SUGAR CANE, AND THE LIKE. I. Traube. Apr. 15, 1931. 10750/32.

PROCESS FOR MAKING SULPHONATED OLEIC ACIDS OR OLEINS. Fettsaure- und Glyzerin-Fabrik Ges. Apr. 14, 1931. 10762/32.

MANUFACTURE OF DYE SOLUTIONS CAPABLE OF BEING INJECTED FOR THERAPEUTIC PURPOSES. I. G. Farbenindustrie. Apr. 16, 1931. 10861/32.

MANUFACTURE OF ACID DYESTUFFS OF THE ANTHRAQUINONE SERIES. I. G. Farbenindustrie. Apr. 16, 1931. 11091/32.

MANUFACTURE OF INDIGOID VAT-DYESTUFFS. I. G. Farbenindustrie. Apr. 16, 1931. 11092/32.

MANUFACTURE OF VAT-DYESTUFFS OF THE PYRANTHRONE SERIES. I. G. Farbenindustrie. Apr. 17, 1931. 11093/32.

PRODUCTION OF ORGANIC ACIDS OR ESTERS THEREOF. E. I. Du Pont De Nemours & Co. Apr. 18, 1931. 11112/32.

PROCESS FOR THE PRODUCTION OF AMMONIUM SULPHATE. Wetial. April 20, 1931. 11229.

MANUFACTURE OF RESINOUS CONDENSATION PRODUCTS FROM AROMATIC AMINES AND FORMALDEHYDE. Soc. of Chemical Industry in Basle. April 23, 1931. 11491.

Applications for Patents

MANUFACTURE OF BENZANTHRONE DERIVATIVES. I. B. Anderson, Imperial Chemical Industries, Ltd., D. C. R. Jones, and R. F. Thomson. April 28. 12289.

PRODUCTION OF ORGANIC SALTS OF BISMUTH. Boot's Pure Drug Co., Ltd., A. P. T. Easson, and F. L. Pyman. April 20. 11973.

HYDROGENATION OF CARBONACEOUS MATERIALS. R. N. B. D. Bruce, Gas Light and Coke Co., R. H. Griffith, and S. G. Hill. April 27. 12155.

MANUFACTURE OF DYESTUFFS. A. Carpmael (*I. G. Farbenindustrie*). April 27. 12147.

MANUFACTURE OF RESIN-LIKE PRODUCTS. A. Carpmael (*I. G. Farbenindustrie*). April 27. 12148.

PREPARATION OF CONDENSATION PRODUCTS OF THE ANTHRAQUINONE SERIES. Chemische Fabrik Vorm. Sandoz. April 29. (Germany, April 29, '31.) 12378.

ABRASIVES. E. I. Du Pont de Nemours & Co. April 28. (United States, April 28, '31.) 12237.

PARTIAL OXIDATION OF UNSATURATED HYDROCARBONS. E. I. Du Pont de Nemours & Co. April 28. (United States, April 28, '31.) 12291.

DYEING WITH AZO DYESTUFFS. F. Farrington, J. Hardcastle and Co., Ltd., C. S. Parker, and C. L. Wall. April 25. 11797.

MANUFACTURE OF MONOAZO-DYESTUFFS. W. W. Groves (*I. G. Farbenindustrie*). April 25. 11864.

PRODUCTION OF COMBINED METALS. J. Y. Johnson (*I. G. Farbenindustrie*). April 25. 11833.

MANUFACTURE OF READILY-SOLUBLE BASIC DYESTUFFS. I. G. April 20. (Germany, June 6, '31.) 11997.

MANUFACTURE OF AROMATIC COMPOUNDS. I. G. April 29. (Germany, April 29, '31.) 12372.

MANUFACTURE OF STABLE BARBITURIC ACID COMPOUNDS. I. G. April 29. (United States, April 29, '31.) 12394.

OIL-SOLUBLE ARTIFICIAL RESINOUS MATERIALS. Imperial Chemical Industries, Ltd. April 28. 12288.

TREATING LIQUIDS WITH GASES, ETC. I.C.I. April 28. 12290.

ANTHRAQUINONE DERIVATIVES. I.C.I., and F. Lodge. April 29. 12415.

REFRIGERATING BY MEANS OF SOLID CARBON DIOXIDE. I.C.I. April 29. 12416.

MANUFACTURE OF ALKALI ALCOHOLATES. Wacker Ges. für Elektrochemische Industrie Ges., Dr. A. April 25. (Germany, June 24, '31.) 11865.

Chemical Matters in Parliament

Dangerous Drugs

IN the House of Commons on April 27, Mr. D. GRENFELL (Glamorgan, Gower), asked the Home Secretary what was the production in Britain during the 12 months ended December 31, 1931, of cocaine, codeine dionin, heroin, morphine and peronin; whether the production was in excess of the requirements for medical and scientific purposes; and whether the convention for the limitation of the manufacture of narcotic drugs is operative in Great Britain.

Sir H. SAMUEL said the answer to the first part of the question was as follows:—Cocaine alkaloid and salts, 14,903 oz.; codeine, 12,525 oz.; dionin, 2,013 oz.; heroin (diacetylmorphine), 3,326 oz.; morphine alkaloid and salts, 46,520 oz.; peronin, nil. The answers to the second and third parts of the question are in the negative.

Publications Received

The Editor welcomes copies of new brochures and leaflets describing plant, equipment and products of interest to chemical manufacturers and the chemical using trades.

THE DRAYTON SURFACE SWITCH described in a leaflet from the Drayton Regulator and Instrument Co., Ltd., is designed for the control of heating systems in which it is desired to obtain switch operation without penetrating the system. The switch consists of a bi-metal helical coil housed in a circular box, suitable for clamping on to the external surface of pipes, tanks, etc. Temperature fluctuations cause rotation of a spindle actuated by the coil and effect control through the medium of a mercury tube switch. The operating temperature of the switch is controlled by a lever projecting through the switch mechanism housing and moving over a marked scale. Standard switches are adjustable for any temperature between 100 and 200° F. Special ranges can be supplied. The differential of the switch is normally from 10 to 15° F., but this depends to some extent upon the rate at which heating and cooling takes place, and will vary according to this factor.

* * *

A NEW standard in heat treatment plant is discussed in a folder issued by Thompson Brothers (Bilston), Ltd., of Bradley, Bilston, and Aldwych House, W.C.2. Heat resisting steels are special alloys which have the peculiar property of withstanding temperatures of up to 1,000° C. for long periods without appreciable scaling. Foremost is Hadfields "Era H.R." and Thompsons are sole makers of apparatus from this steel, by arrangement with Hadfields, Ltd. It is necessary to joint the material when making commercial shapes, and after extensive tests the company has decided that welding is the best method. Its welds are strong, homogeneous and have the same characteristics as the raw material. They can therefore be subjected, with confidence, to the same test as the material of the box. It is claimed that there is no comparison between the life of "Era H.R." and mild steel vessels. Usually "Era H.R." lasts ten times at least the life of mild steel vessels at a temperature of 950° C. The company has records of a case hardening pot, of its manufacture, lasting 2,000 hours, and this is still as good as when new.

* * *

THE A.P.V. heat exchanger is the subject of a brochure from the Aluminium Plant and Vessel Co., Ltd., of Point Pleasant, Wandsworth. The A.P.V. heat exchanger was designed about eight years ago primarily to meet a very definite need in the liquid foodstuffs industries to handle milk, sugar solutions, wort, vinegar, beer, cream, etc. Machines for such duties must be readily cleanable, sterilisable, and capable of working efficiently with relatively low temperature differences. The success this patented machine has had in these industries, not only in this country but also on the Continent and in America, has directed attention to the possibility of using the same type of plant in the chemical industry where heat exchange is of such economic importance to the manufacturer. For many liquids this type of heat exchanger offers an ideal solution of the problem of forced circulation evaporation. In conjunction with a suitable flashing off chamber and pump very high evaporative efficiency can be obtained either under normal or reduced pressure whilst retaining all the advantages of easy access for cleaning, continuous working, adaptability, etc. One further advantage is that for delicate liquids the heating medium can be a second liquid whose temperature can be accurately controlled at a few degrees only above the boiling point of the liquid undergoing evaporation, thus avoiding all danger of overheating. Further patents have recently been granted in which the basic principles of this type of heat exchanger, *i.e.*, the use of nested grooved plates, is simply adapted so that it can be used as an evaporator, dephlegmator, or condenser. This type of machine can also be supplied to work either at atmospheric pressure or under vacuum and at normal steam pressures.

DURING 1931 United States nicotine imports originated exclusively in Soviet Russia. The chief type was nicotine sulphate, of which 83,224 lb. were entered, followed by free nicotine, 50 per cent., 4,233 lb., and free nicotine 95.99 per cent., 1,159 lb.

BROWN & FORTH, Ltd.

Telephone: Museum 7621-2-3 **LONDON: Nettlefold House (Reg. Office), 163, Euston Road, N.W 1.** Telegrams: "Cereblue, Phone: London."

Telephone: Moss Side 1347-8 **MANCHESTER (Works): 118, Chorlton Road.** Telegrams: "Idem, Phone, Manchester."

DISTRIBUTORS FOR THE BRITISH EMPIRE
FOR THE PRODUCTS OF THE FIRMS MENTIONED BELOW

SOCIÉTÉ d'ÉLECTRO-CHIMIE, d'ÉLECTRO-MÉTALLURGIE et des ACIÉRIES ELÉCTRIQUES d'UGINE

Registered Office: 10, Rue de Général Foy, PARIS (8e)

WORKS AT:

Saint Michel de Maurienne
Saint Avre la Chambre
N.-D.-de Briancon
Pomblière Saint Marcel
La Bathie
Ugine
— SAVOIE —
Saint-Jeorie-en Faucigny (Hte. Savoie)
Les Clavaux, by Rioupéroux (Isère)
Jarrie (Isére)
Pierre Bénite (Rhône)
La Barasse, Saint-Marcel (B. du R.)
Villers-Saint-Sèpulcre (Oise)
Vallorbe (Switzerland)

CHEMICAL PRODUCTS:

Chlorates of Potash, Soda, and Barium. Perchlorates of Potash and Soda.
Cyanides of Soda; Potash; Zinc; Copper; Cadmium.
Fluorides, Hydrofluoric Acid. Chloride of Lime, Caustic Soda.
Tetrachloride of Carbon. Chlorobenzene, Liquid Chlorine.
Peroxide of Soda, Anhydrous Ammonia. Perborate of Soda.
Sulphate of Alumina, Potash Alum.
Hydrogen Peroxide Electrolytic 100 vols. Bauxite, Fluorspar.
Carbide of Calcium. Magnesium, Aluminium, Calcium.
Cerium-Ferro-Cerium. Carborundum-Abrasives.
Artifical Cryolith. Hydrated and Calcined Aluminas.
Benzene, Toluene, Xylene.

Flotation or Cleansing of Ores—Thiocarbanilide, Xanthate, etc.

China Clay for the Paper Trade, Potteries, etc.—Mines in Cornwall.

"Flotex" Cellulose Fast Colour Finishes for Leather—Factory, London.

Van Lerberghe Frères & Cie., Courtrai, Belgium—White Lead, Dutch Stack process.
White Lead in Water Paste Form.

Ostdeutsche Verkaufsvereinigung für Cumaronharz G.m.b.H.
Karlstrasse 1, Berlin, N.W.6.—Coumarone Resin.

Radium Bronze Powder and Leaf Metal Works, Fuerth, Bavaria.
Bronze and Aluminium Powders and Metal Leaf.

Manufacturers of Washing Powders for Laundries and Engineers. Textile Soaps for all purposes.

Suppliers of: Solvents, Synthetic Resins,
Dyestuffs, Ultramarines, Prussian Blues and Pigment Colours

And all CHEMICALS for the Textile Industry, Tanneries, Paint and Varnish Manufacturers, Paper Factories, Rubber Factories, Chromium Platers, Plastic Industry and Miscellaneous Industries.

This advertisement will appear every alternate month.

Company News

NEWTON, CHAMBERS, AND CO.—A final dividend of 3½ per cent., tax free, making 6 per cent. for the year 1931, is to be paid on the ordinary and on the preference shares.

TUBIZE ARTIFICIAL SILK CO.—The accounts show a trading profit of 3,399,603 fcs., against 6,717,662 fcs., and interest, etc., at 90,405 fcs., against 993,720 fcs. Expenses, etc., took 7,871,374 fcs., compared with 6,662,840 fcs., besides which the company lost 5,460,858 fcs., on debts and exchange. The net result is a loss of 9,842,133 fcs. against a profit of 1,048,542 fcs.

BRITISH MATCH CORPORATION.—The net revenue for the year ended April 31, 1932, amounted to £442,507, against £461,387 for the previous twelve months. With £94,789 brought in there is available £537,386. The preference dividend requires £21,950, while £40,000 is again written off goodwill, rights, etc., and, in addition, £50,000 goes to reserve. The dividend on the ordinary shares is maintained at 6 per cent., free of tax, absorbing £371,250, a balance of £54,186 being carried forward. The annual meeting will be held at Beaver House, Cannon Street, London, E.C., on May 11, at 2.30 p.m.

CROSFIELDS OIL AND CAKE CO.—The report for the year ended March 31, 1932, states that the net profits (after providing for all charges, 10 per cent. depreciation of plant, directors' fees and income tax) amount to £21,300, against £8,496 last year, to which is added the credit balance brought forward, £3,361,, making £24,661. The directors recommend a dividend of 15 per cent. as compared with 10 per cent. last year, less tax, £11,000, placing to general reserve £8,500, to staff reserve £1,000, carrying forward £4,161. The annual meeting will be held at 14 Cook Street, Liverpool on May 12, at 11 a.m.

BRITISH OXYGEN CO., LTD.—The accounts for 1931, the first issued since the absorption of Allen-Liversidge, Ltd., show a profit of £70,160. In the previous period of nine months the profit was £61,900, while that of Allen-Liversidge, for the eight months to December, 1930, was £34,067. The consolidation of the two organisations has taken place during the year, states the report, but the benefits arising therefrom only began to operate effectively in the latter part of the year. The general reserve and undistributed profits of Allen-Liversidge, amounting to £101,448, not being available for dividends, have been transferred to capital reserve.

GOODLASS WALL AND LEAD INDUSTRIES, LTD.—The directors announce a dividend of 2 per cent. actual, less tax, on the ordinary shares, for the thirteen months to December 31, 1931.

WILLIAM GOSSAGE AND SONS.—The net profit for the year 1931 was £299,727. The balance brought forward was £33,250, making a total of £332,977. To general reserve is placed £15,438 and £53,789 is to be carried forward.

VEREIN FUR ZELLSTOFF INDUSTRIE.—The Union for Cellulose Industry Co., which in the previous year paid a dividend of 6 per cent. on a capital of £350,000, this year—after having increased its capital by £200,000—shows a loss of £81,500.

WALL PAPER MANUFACTURERS, LTD.—The directors recommend an interim dividend of 5 per cent. on the ordinary shares, and an interim of 4 per cent., on the deferred shares in respect of the year ending August 31, 1932.

BIDEFORD BLACK, LTD.—The report for the year to January 31, 1932, shows development expenses increased by £4,871, to £15,849. Preliminary expenses stand ata £3,803. The annual meeting will be held at Winchester House, London, E.C., on May 18, at 12 noon.

ALUMINIUM CORPORATION.—The trading profit for the year 1931, after providing for depreciation, amounts to £8,883. After payment of debenture stock and mortgage interest and directors' fees, the net loss was £8,108, which, added to £13,077 brought forward, makes a total debit at profit and loss account of £21,185 to carry forward.

BOOTS PURE DRUG CO.—A net profit of £731,890 is announced for the year ended March 31 last, against £722,264 for the preceding year. A bonus of 1s. per share, free of tax, will be paid to ordinary shareholders registered on May 2. This is the same as for the three preceding years. Four quarterly dividends at the rate of 24 per cent. per annum have been paid during the year.

BELL BROTHERS (MANCHESTER, 1927).—A loss of £4,465 for the year to March 31 last is reported, after crediting £1,007 interest on investments. After deducting the balance brought in of £2,660, the debit balance forward is £2,205. No dividend is to be paid on the preference shares. The annual meeting will be held at 24 Coleman Street, London, on May 12, at 12 noon.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

Mortgages and Charges

[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]

CEMENT INDUSTRIES, LTD., London, S.W. (M., 7/5/32.) Registered April 21, series of £70,000 debentures, present issue £4,300; general charge.

DEWEY AND ALMY, LTD., London, S.W., manufacturers of adhesives, &c. (M., 7/5/32.) Registered April 22, charge to Barclays Bank, Ltd., securing all moneys due or to become due to the Bank; charged on land and premises in Angel Road, Edmonton. *——. July 8, 1931.

DURIUM PRODUCTS (GREAT BRITAIN) LTD., London, W. manufacturers of gramophone records. (M., 7/5/32.) Registered April 26. £1,000 debentures, part of £10,000 (not ex.); general charge.

Satisfactions

BRITISH ALUMINIUM CO., LTD., London, E.C. (M.S., 7/5/32.) Satisfaction registered April 27, £1,000,000 &c., registered October 21, 1910, and January 23, 1925.

BRITISH OXYGEN CO., LTD., London, N. (M.S., 7/5/32.) Satisfaction registered April 20, £250,000, registered June 2, 1921, and April 13, 1922.

SILVER SPRINGS BLEACHING AND DYEING CO., LTD., Congleton. (M.S., 7/5/32.) Satisfactions registered April 25, £7,000, registered June 26, 1901, £7,000 registered October 10 and December 4, 1902, and £7,000 registered April 14, July 6 and August 8, 1904.

Company Winding-up Voluntarily

BULMER RAYON CO., LTD. (C.W.U.V., 7/5/32.) By special resolution April 22. Laurence Edwin Shaw, of 48 Copthall Avenue, London, E.C.2, appointed liquidator.

New Chemical Trade Marks

Compiled from official sources by Gee and Co., Patent and Trade Mark Agents, Staple House, 51 and 52 Chancery Lane, London, W.C.2.

Opposition to the registration of the following Trade Marks can be lodged up to May 27, 1932.

H.S. User claimed from April 3, 1929. B527494. Class 1. Spectroscopically standardised chemical substances for use in spectroscopic and physical research. Adam Hilger Ltd., 24 Rochester Place, Camden Town, London, N.W.1. November 30, 1931.

Flodia. 530206. Class 1. Chemical substances used as fixatives in the manufacture of perfumery to prevent the perfumes evaporating quickly. Howards and Sons, Ltd., Uphall Works, Uphall Road, Ilford, Essex. March 14, 1932.

Crisalbine. 528,388. Class 3. Double thiosulphate of gold and sodium, being a chemical substance prepared for use in medicine and pharmacy. May and Baker, Ltd., Garden Wharf, Church Road, Battersea, London, S.W.11. January 6, 1932. (The entry on the Register of No. 461294) will be cancelled if and before this Mark is registered.)

Pragmoline. 528389. Class 3. Chemical substances prepared for use in medicine and pharmacy. May and Baker, Ltd. January 6, 1932. (The entry on the Register of No. 515876 will be cancelled if and before this Mark is registered.)

Chemical Trade Inquiries

Abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

BRITISH WEST INDIES.—A recently established manufacturers' representative in Port of Spain desires to obtain the representation, on a commission basis, for Trinidad only, of United Kingdom manufacturers of druggists' sundries, paints and varnishes. (Ref. No. 776.)

HAYTI.—A firm of agents in Port-au-Prince wishes to obtain the representation of United Kingdom manufacturers of perfumery in all qualities and pharmaceutical preparations. (Ref. No. 817.)

TURKEY—IZMIR (SMYRNA).—A commission agent desires to obtain the representation of a United Kingdom manufacturer of crêpe rubber in sheets in connection with a proposed local boot and shoe factory. (Ref. No. 811.)